COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Framingham, Mass., and additional mailing offices ©1981 by CW Communications, Inc.

Vol. XV, No. 38 September 21, 1981 $1.25 a copy; $36/year

NEWSPAPER

CW at Software Info

'Inquire,' 'IQ/Net' DBMS Gain Distributed Versions

By Rita Shoor
CW Staff

CHICAGO — Infodata Systems Inc. introduced distributed data base versions of its Inquire and IQ/Net data base management systems in a live demonstration at the Software Info conference here last week.

Both software products are IBM-compatible, with Inquire designed for IBM 370 and 30 series machines and IQ/Net running on 4300 series hardware. The distributed data base versions of the DBMS will allow companies with a mix of IBM CPUs and operating systems to access information from any IQ/Net or Inquire in the network, according to Harry Kaplowitz, Infodata executive vice-president.

(Continued on Page 6)

Release 3.0 of 'Mantis' Among Conference Debuts

By Lois Paul
CW Staff

CHICAGO — Among the products unveiled at Software Info here last week was a new release of Cincom Systems, Inc.'s Series 80 Mantis featuring a logical data base management system view, import/export reorganization utility, attribute modification, printer support, pseudo-conversational CICS and E/1 Vtam support.

The vendor said Release 3.0 of Series 80 Mantis enables users to access Series 80 Total files on-line and to perform revision using four Mantis commands and their options.

The purchase price of OS/DOS Mantis for E/1 users with support for up to eight CRT terminals is $30,000; installation costs $2,500. The

(Continued on Page 6)

M&D Announces 'Hilite,' On-Line Query System

By Rita Shoor
CW Staff

CHICAGO — McCormack & Dodge Corp. introduced Hilite, an on-line query system designed to provide end-user access to its general ledger, fixed assets and accounts payable financial software systems, at the Software Info conference here last week.

Designed to run on IBM and IBM-compatible computers in a CICS environment, Hilite was specifically designed to allow accounting department users to retrieve information normally not available through more generalized inquiry systems, according to President James McCormack.

The product is driven by a user-friendly command lan-

(Continued on Page 6)

RSI Trots Out C Compiler To Run on IBM Systems

CHICAGO — A C compiler for IBM 370, 4300 and 30 series mainframes was introduced by Relational Software, Inc. at Software Info.

The compiler, which adapts C programs and packages for IBM systems, is part of RSI's plan to transport its Oracle relational data base management system to IBM mainframes, a spokesman said. Written in C, Oracle currently runs on Digital Equipment Corp. computers.

The package includes the compiler, a runtime library to support the compiler and programs under VM and MVS; and a screen-oriented debugger for VM. Its $10,000 price includes an installation manual, documentation and a year of vendor support. RSI is at 3000 Sand Hill Road, Menlo Park, Calif. 94025.

A Show For Serious Shoppers

By Rita Shoor
CW Staff

CHICAGO — With double the number of last year's exhibitors and triple the floor space, the second annual Software Info conference drew more than 10,000 people to the Merchandise Mart Expo Center here last week.

Whether those people were looking for application packages or programmer productivity tools, telecommunications software or data base management systems, performance evaluators or text processing aids, more than

(Continued on Page 6)

PE Adds 32-Bit Mini; Underprices Top DG, DEC 16-Bit Machines

By Tim Scannell
CW Staff

OCEANPORT, N.J. — A 32-bit supermini that costs less than top-of-the-line 16-bit machines from Digital Equipment Corp. and Data General Corp. was introduced today by Perkin-Elmer Corp.

PE's entry-level Model 3210 equals the performance of its previous low-end Series 3200 system, the 3220, and roughly rivals the CPU power of DEC's VAX-11/750, also a 32-bit system. With a base price of $49,900, however, the 3210 costs about $20,000 to $30,000 less than PE's 3220 and at least $30,000 less than DEC's VAX-11/750 supermini — making it the least expensive 32-bit system available today.

More importantly, the 32-bit computer also costs about one-third less than similarly configured and less powerful 16-bit DEC PDP-11/70 and DG C/350 computer systems.

Introduced nearly two years to the day after PE's top-of-the-line 3240 was unveiled, the 3210 is the first of the firm's 32-bit systems to incorporate 64K-byte chip technology. The chips are used in the system's 1M- and 2M-byte memory boards and allow the computer to handle a maximum of 4M bytes of directly addressable main memory.

The only competing 32-bit system that uses this type of chip technology in its memory design is Prime Computer, Inc.'s Model 850, according to Richard Donnelly, PE's product manager for computer systems.

Since the 3210 is aimed at the 16-bit market, its two main selling points are price and performance. For instance, a Model 3210 with 512K bytes of memory, 20M bytes of disk storage and PE's OS/32 operating system, costs about $56,000. A similarly configured DG C/350 system sells for about $79,000.

A DEC PDP-11/70 with the same memory, 80M bytes of

(Continued on Page 4)

Exec: DPer's Destiny Hinges on Top Brass

By Marcia Blumenthal
CW Staff

DENVER — Gaining credibility with top corporate brass is one of the principle challenges management information system managers will have to meet if they are to gain admittance to the ranks of top management in an organization.

Until recently, MIS managers have shaped their own destinies in organizations. "The senior management has not been able to participate in the evolution of the data services function within the organization," maintained Robert E. Lee, president and chief executive officer of the First National Bank of Denver.

Lee and other non-MIS executives offered their views of the MIS manager's plight at a round table session at the Society of Management Information Systems (SMIS) annual conference here last week.

"One of the biggest problems is that chief executive officers and corporate boards of directors have trouble changing a situation they have difficulty understanding," offered Robert K. Wilmouth, chief executive officer of the Chicago Board of Trade.

Although some SMIS members think the problem of the MIS director's ability to assume line status in an organization is receding, other members disagree. As one frustrated executive, representative of many attending the conference, said: "Chief executive officers don't think

(Continued on Page 10)

SMIS coverage continues on Pages 14 and 15.

ELECTRONICS UNDERWORLD

Organized Crime Linked To High Tech Black Market

By Christopher Simpson
Special to CW

Rumors of connections to organized crime seem to travel closely behind news of the black market in stolen microcomputer chips and other sophisticated computer technology.

One key figure in the recent theft of 10,000 Model 2732 microcomputer chips from Intel Corp. [CW, Sept. 7], for example, is said to be closely linked to the "Israeli Mafia," a brutal gang of Israeli immigrants active in drug smuggling, murder and insurance scams in the Los Angeles area.

Another figure is said to have obtained $10 million through his relatives, who are "known . . . as being involved in the Mafia," according to one defendant in that case. The money was allegedly used to bankroll trade in stolen chips.

The "electronics underworld" is clearly well orga-

(Continued on Page 8)

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THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Second-class postage paid at Framingham, Mass., and additional mailing offices PN127420. *Computerworld* (ISSN-0010-4841) is published weekly, except: semiweekly the third week in March, the first week in September and a single combined issue the last week in December and the first week in January by CW Communications/ Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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$1.25 a copy: U.S. — $36 a year; Canada, Central & So. America — $65 a year; Europe and Near East — $125 a year; other foreign — $175 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microform through University Microfilm Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. *Computerworld* is indexed: write to Circulation Dept. for subscription information.

POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Exec: Bell X.25 Packet-Switched Net To Impact 'Relatively Small Number'

By Bruce Hoard
CW Staff

NEW YORK — The impact of a Bell packet-switching network on users will be limited to "a relatively small number of time-sharing companies, Fortune 500 industrial companies and some top commercial banks," a management consultant predicted here last week.

Kenneth G. Bosomworth, president of International Resource Development, Inc., would not predict the impact of the recent Bell offering on Telenet, Tymnet and other packet-switching networks because prices for it were not disclosed. Bosomworth said Bell could undercut its competition pricewise, but added it is more likely to charge about the same — at first.

AT&T recently announced its intention to develop a regulated X.25-based packet-switching network to compete against offerings from Telenet and Tymnet. The network, which would not feature protocol conversion, will be operable by late 1982 or early 1983, pending "business decisions and regulatory approval," according to Bell.

Bell's announcement follows an IBM unveiling last month of an X.25 interface for its systems; the AT&T version is likely to be compatible with it and other X.25 interfaces from such vendors as Control Data Corp., NCR Comten, Digital Equipment Corp., Data General Corp., Honeywell, Inc., Raytheon Corp. and Prime Computer, Inc.

"If they are compatible with CCITT [the Consultive Committee on International Telegraph and Telephone], they should be compatible with the network," said Bell's Gary Handler, division manager of Network Services Project Management.

Stressing that the network's development is still in its infancy, Handler said its geographical extent has not been determined. He did say the network would remain within the boundaries of Computer Inquiry II.

That Federal Communications Commission (FCC) ruling paved the way for Bell to enter the unregulated communications market through a fully separate subsidiary. However, it kept the common carrier's voice and data network under regulation.

"It's simply X.25 in and X.25 out," Handler said of the network, adding there will be no protocol conversion. Tymnet and Telenet feature protocol conversion.

An $11 technical manual describing the X.25 interface is being offered. The interface is said to support the CCITT virtual call and permanent virtual circuit services and essential facilities for those services.

In addition, it reportedly supports fast select and hunt groups while providing data transmission speeds of 9.6K bit/sec and 56K bit/sec.

Tariffed Service?

The FCC may or may not choose to embrace the network as a basic service subject to regulation. Bell thinks it will. "This is a basic service and it will have to be tariffed," the division manager asserted.

Referring to the "business decisions" cited by Bell, Handler explained top AT&T management will continue to explore the profit potential of the project until shortly before its tariff is filed.

Asked if the telephone company would offer its packet-switching customers access to compatible European networks such as France's Transpac, he replied, "While ultimately we plan to support it, I would say probably the first offering may not."

Handler said Bell's Dataphone Digital Service (DDS) lines are "obviously compatible" with packet switching, fueling speculation that they will be used by the proposed network.

He denied the network would be the same as Bell's long-delayed Advanced Communications Service (ACS), which is said to have enhanced capabilities such as processing and storage.

Bosomworth said AT&T's announcement came as "no suprise to anyone."

He claimed Bell has coveted such a network since ACS stalled and predicted the company is unveiling it in pieces deliberately. By introducing the "basic backbone" only, Bell is making it harder for the FCC not to categorize the entire service as basic, and thus subject to regulation. Is it an enhanced service or not? "I think that's an interesting question," Bosomworth responded.

This Week

HISTORY OF COMPUTING — PART 7 . . . Page 45

IN DEPTH

Computing Education: Part 1 . . . . . . Follows Page 68
Structured Maintenance: Warnier/Orr Way . . . ID/11
Changing Roles for Information Managers ID/20

NEWS

United Technologies Enters PABX Market 4
Revolution Predicted in Big Firms 7
Automated Office to Ease Data Entry Drudgery 9
IMSL Unwraps Fortran Tool for Non-DPers 10
Would Certification Ensure 'Moral' DP Staff? 11
Commercial DP Users Urged to Consider AI 12
NSA Chief Pledges Open DP Security Center 13
IBM's 3380 Problems Delay Amdahl Support 14
Japanese Productivity Begins During Hiring 15
Bell Nixed on Bid to Dismiss Antitrust Case 16
SNA and IBM Have Much in Common 17
Black DPer Breaking the Mold 18
Black DPers Told to 'Count on Themselves' 19
Political Moves Go On-Line With 'Calliope' 20
U.S. Firms, Trade Groups Back Privacy Rules 21
EDS, CSC Lock Horns Over Army Contract 22
Managers on the Move 23
Moffat: Execs Unaware of DP Vulnerabilities 24
Farrell: 'Jesse James' Rides on in '80s 25
Exec: Best Cash Managers Have Least Cash 26
Professor Sees Economic Upturn 30
GL Helps Heublein Uncork T/S Bottleneck 31
Savin Selects Unis-100 for U.S. Copier Plant 33
DG's CS/50 Rated Above Average by Users 38

EDITORIAL

Editorial: New Twist in Job Threats 50
Why Another Language? 51
Human Connection: 'Problem' DPer Blames Staff . . 51

SOFTWARE & SERVICES

Help Coming for 34-to-38 Conversions 55
Package for DEC Provides CPU-to-CPU Link 58
All Modules to 'CSS' Enhanced or Rewritten 59
RDS Unveils Screen-Oriented Text Editor 60

COMMUNICATIONS

Ztel PBX: New Idea in an Old Factory 65
'Unet' Boosts DEC, CDC Transmission 67
Tektronix 4020 Gets Graphics, Color Features . . . 68

SYSTEMS & PERIPHERALS

One CPU to Unite 19 California Colleges 69
Imaging System Released for CAD by AED 70

MINIWORLD

Users Give Vector Graphics Top Marks 71
MSC Expands Model 1990, Unveils HP Storage . . 73

OFFICE AUTOMATION

Tabletop CPU, Terminal Announced by Datapoint . . 75
TCS Turnkey Supports Accounting Applications . . . 77
Three Obstacles Cited in OA Implementation 78
IRM Seen Way to Assure Data's Corporate Value . 79
Basic Four Unveils Wide Printer 80
Xerox Unveils Mailing Systems 81
'Tips' WP Software Runs on DG Computers 82

COMPUTER INDUSTRY

F&S Sees 37% Growth in Intelligent Terminals 83
Issco Hitching Graphics Star to Joint Ventures 83
ADR Gains Exclusive Rights to 'Data Designer' . . . 86
Intel Starts Custom Foundry for LSI Designers 88
Designer of TRS-80 Quits Tandy 89

ADVERTISING INDEX 126

GOOD LUCK, IBM

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IE COMPUTER COMMUNITY

., and additional mailing offices · 1981 by CW Communications, Inc.

$1.25 a copy; $36/

ry 9, 1981

IBM Contender Enters Relational Sweepstakes

By Rita Shoor
CW Staff

WHITE PLAINS, N.Y. – IBM introduced a relational data management system last week as its first official entry in what may be the 1981 relational sweepstakes.

The Structured Query Language/-Data System (SQL/DS) supports application areas where interactive query, report writing and end-user data base facilities are desired.

Although SQL/DS was designed specifically to extend the DOS/VSE system environment, IBM's official statement of direction made it very clear that MVS and VM installations can look forward to a similar offering operating systems. "It is

SQL/DS supports a relational data model, the vendor emphasized, with data being defined in tabular form and accessed through operations on those tables. The two-dimensional tables, which are the structural part of the relational model, would normally have a fixed number of columns and a variable number of unnumbered rows, according to IBM.

The informational view presented to a user of the logical tables need not conform to the actual physical representation of the stored tables. Views may combine data from several stored tables or other views and may create subset tables by rows and/or columns.

And, since SQL makes it unnecessary to know the physical structure of the data base, the relational model can ef- "broad range of

's, Technicians

Changes

CICS/OS/VS

lent, a batch utility and application programs, a spokesman explained.

By entering various SQL commands through a terminal, users can report- without

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To enjoy the benefits of relational DBMS you could call IBM. Next year. Or you could call ADR. Today. And get the relational system that's available for immediate delivery.

ADR's DATACOM Product Group is part of ADR's integrated network of systems software products that solves today's problems and builds a solid foundation for tomorrow. Contact your local ADR office or send in the coupon to learn more about ADR's commercial implementation of the relational concept.

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United Technologies Enters Voice/Data PABX Market

By Bruce Hoard
CW Staff

NEW YORK — United Technologies Corp. broke into the telecommunications business last week by unveiling a digital voice/data private automatic branch exchange (PABX).

Introduced by the Building Systems Group and developed by Lexar Corp., a recent United Technologies acquisition, the PABX — designated the Lexar Business Exchange (LBX) — joins a growing list of voice/digital PABXs offered by such vendors as Datapoint Corp., Rolm Corp., Intecom, Inc. and Northern Telecom, Inc.

The LBX is said to offer access to five lines on a single telephone number and automatic call forwarding. Its capacity is reportedly 1,024 universal ports configured in two central units featuring 512 ports each.

Voice and Data

Voice and data transmissions are offered through single-button access and no modems are required for internal communications. The LBX pools modems for external communications up to 56K bit/sec.

The universal ports allow a station port to receive single- or multiline telephones, data terminals or a telephone and a terminal.

The LBX was designed to provide savings in heating and maintenance costs by monitoring and diagnosing voice and data communications, elevators, fire and security equipment and heating, cooling and ventilating systems.

Lexar President William L. Salway pointed out what he called advantages enjoyed by the LBX over its PABX competitors in an interview. Addressing himself to the Rolm CBX and Northern Telecom SL-1, he said, "We believe that is 1975 technology, which has been retrofitted to meet the demands of the integrated voice/data business."

The Rolm and Northern Telecom units are limited in terms of the number of data phones that can be supported, Salway said, and he questioned their abilities to support voice and data through the same port.

As far as the Intecom IBX and Datapoint ISX are concerned, the ISX integrates data through an add-on module, which sits next to the telephone, Salway declared. That makes it up to $450 per port more expensive than the integrated LBX, he said.

For voice only, the LBX costs $1,000 per port installed; the added data capability pushes the cost to $1,350. That includes the digital adapter and necessary support equipment.

The Intecom IBX is geared for groups of 1,000 stations or more, while the LBX was designed for between 200 and 1,024. "With a 1,024 system, you're probably talking about 850 telephones," he said.

United Technologies is located in Hartford, Conn.

New Financial System Squelches Rumor of IBM Market Withdrawal

WHITE PLAINS, N.Y. — Quelling rumors that it is getting out of the financial systems business, IBM last week announced the 4700, a big brother to the 3600 system, which offers Cobol support, twice as much main memory and capabilities to support more workstations and applications.

Compatible with the 3600, the 4700 supports up to 512K bytes of main memory and up to 1M byte of diskette storage, IBM said.

Available in the third quarter of 1982, the system consists of a 4701 communications controller, a 4704 display screen and a 4710 printer. The 4701 can operate multiple network stations and communicate with a host IBM 370, 30 series, 4300, 3081, System/34 or compatible systems.

The 4704 terminal features modular display screens and keyboards that can be used in either teller and administrative workstations. Workstations can be tailored to individual needs offering a 5½-in. CRT that can display 480 characters of information or a 9-in. screen that can display 1,920 standard-size characters or 480 enlarged characters.

An optional Personal Identification Number keypad is also available for reading magnetic stripes on credit cards, according to IBM. The 4710 printer can be shared by two tellers for receipt/validation applications. It prints on checks, receipts and journal rolls at speeds up to 120 char./sec.

Programming support includes Cobol and an advanced version of assembler, the language used on the 3600. Both 4700 Cobol and assembler programs can run concurrently on the 4701 controller, IBM said. Host support programs, including 4700 Host Support Release 1 and 4700 Cobol compilers for both OS/VS and DOS/VSE operating systems, were also announced by IBM.

Keeping with its apparent plan to cut maintenance costs, IBM announced a service plan similar to that offered on the recently announced Personal Computer. The plan offers replacement or repair of 4700 components through designated IBM repair locations. Peripherals have to be delivered to the repair location. However, IBM said 4701 controllers will be serviced in-house through the same IBM repair facilities.

A typical 4700 system with seven 4704 terminals and magnetic stripe readers, six 4710s and a 4701 costs roughly $35,000. Volume discounts are available on more than 20 Model 4701s, 100 or more 4710s and 150 or more 4704s. However, the user must install his system within 18 months to qualify for the volume discounts.

The 4700 Finance Communication System Host Support Release 1 costs $703/mo, including maintenance. The license fee for the 4700 Cobol OS/VS Host Compiler and Library is $519/mo and the monthly license fee for DOS/VSE Cobol compiler is $381.

PE Introduces Supermini

(Continued from Page 1)

disk storage, a tape drive and DEC operating system, costs $111,000. A 3210 configured that way carries a $78,000 price tag, according to PE.

While no benchmarks have yet been run between the 3210 and the DEC and DG machines, PE's system offers 40% to 60% more performance than the two 16-bit computers, Donnelly said.

The 3210 — which stands about 30 in. high — looks physically different from its "refrigerator-size" 56-in. predecessors. On the inside, however, the 3210 has relatively the same design as the three other systems in the 3200 series and shares the same upward compatibility.

Like the 3220, 3230 and 3240, the newest systems member has a total 32-bit architecture, including 32-bit internal data and memory paths for high throughput. The system also supports PE's memory management hardware, which provides memory segmentation, relocation and protection under operating system control; an error correction code system; and error logger to isolate problem areas in the memory.

The 3210 can also utilize PE's optional Floating-Point Processor, which provides hardware support of 48 single- and double-precision floating-point instructions for extended calculations.

Unlike the 3220, 3230 and 3240, the 3210 does not have a cache memory. However, because of its 64K-byte chip roots, the system reportedly has a memory access time of 400 nsec, about 20% faster than both the 3220 and the 3230. The system can also support up to 32 concurrent users running a variety of applications.

Peripherals for the Model 3210 include up to 80M bytes of Winchester disk storage, plus an additional 16M bytes of removable dual-cartridge disk storage; a CP180 printer; and PE's Models 550 and 1251 terminals.

The 3210 uses a variety of 32-bit software languages such as Fortran VII, Pascal and Coral 66 on the scientific side and Cobol, RPG-II and PE's Reliance on the business end of the spectrum. It can also use PE's Hasp/32, IBM's 2780/3780 and Synchronous Data Link Control and other data communications protocols.

A typical commercial 3210 system consisting of a 512K-byte processor, 32K bytes of fixed and removable disk storage, two terminals, a clock, loader, battery backup, memory error logger, printer, operating system and three transaction-oriented software packages costs $63,900. Technical development and bare-bones OEM packages are also available.

Deliveries are scheduled for later this month, PE said from 2 Crescent Place, Oceanport, N.J. 07757.

Characteristics \ System	Digital Equipment Corp. VAX-11/750	Data General Corp. C/350	Perkin-Elmer Corp. 3210	Perkin-Elmer Corp. 3220	Perkin-Elmer Corp. 3230	Prime Computer, Inc. Series 50 250 II
Relative Performance[1]	60	24	50	50	53	26
Mips[3]	1.1	40	.90	.90	.93	.46
Main Memory in Bytes (Min-Max)	512K-2M	384K-2M	512K-4M	256K-4M	512K-8M	512K-1M
Purchase Price[2] (Main Memory)	$89,900[4] (512K)	$56,500 (384K)	$49,900[5] (512K)	$36,000 (256K)	$65,800 (512K)	$48,500 (512K)
Lease Price (Lease Term)	None	None	None	None	None	None
Machine Cycle Time (nsec)	320	700	250	250	250	Not Available
Channels (Min-Max)	1-4	1	7	7	8	3-4
Cache (Buffer) Size	4K	None	None	1K	1K	2K
Bus Architecture?	Yes	Yes	Yes	Yes	Yes	No
Price per 1M Byte of Main Memory	$19,800	$28,000	$15,900[6]	$32,000	$23,900	$40,000

1. CW estimates based on vendor-supplied performance information.
2. Includes processors, console, power supply, operating softwara and minimum tape and disk drives.
3. CW estimates.
4. VAX-11 purchase prices include processor, console, power supply, operating softwara and a minimum disk drive configuration.
5. Includes system console, power supply with battery backup, 27M-byte cartridge disk drive, selector channel and disk controller.
6. 2M-bytes of 64K-bit chip memory available for $25,900.

Current Lineup

An Alternative, Not Threat to 3220

OCEANPORT, N.J. — Sporting 64K-byte chips, a smaller pricetag on its processsor and less expensive memory, Perkin-Elmer Corp.'s 3210 appears to be a threat to the firm's current entry-level system, the 3220. However, PE likes to think of its latest 32-bit offering as a transitional alternative rather than a metal-and-wire competitor.

The 3210 does represent a new gateway and possible competitor to PE's own 3220, but it was developed more to attack high-end 16-bit systems in the $50,000 to $60,000 range. This $5 million per year area is generally known as "the fat part of the 16-bit market," PE's Richard Donnelly said.

Using less expensive 64K-byte chips in the 3210's memory design allowed PE to drop the base cost of its 32-bit family, making it competitive with Digital Equipment Corp.'s and Data General Corp.'s "bread and butter" 16-bit systems lines. Currently, 512K bytes of standard memory costs about $13,000; 1M byte of 64K-byte chip memory sells for about $16,000; and 2M bytes costs about $26,000, Donnelly said.

Current 3220 users, which make up the bulk of PE's installed base, will continue to be supported by the firm. However, these users will not be able to make what PE considers a lateral switch from a 3220 to a lower priced 3210 and its 64K-byte chip technology — at least not under PE's present upgrade policy.

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NOV. 16-20 WASHINGTON

APPLIED ARTIFICIAL INTELLIGENCE

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OCT. 19 ST. LOUIS
OCT. 21 TORONTO
OCT. 22 OTTAWA
OCT. 27 PITTSBURGH
NOV. 2 SEATTLE
NOV. 4 PHOENIX
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OCT. 5-9 PALO ALTO, CA

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OCT. 5-9 FAIRBANKS, AK
OCT. 5-9 INDIANAPOLIS
OCT. 5-9 MINNEAPOLIS
OCT. 19-23 BOSTON
OCT. 19-23 MILWAUKEE
OCT. 26-30 LOS ANGELES
OCT. 26-30 NEW YORK
NOV. 2-6 PHOENIX
NOV. 2-6 TORONTO
NOV. 9-13 AMSTERDAM
NOV. 9-13 CALGARY
NOV. 16-20 CHICAGO
NOV. 16-20 DALLAS
NOV. 30-4 DENVER

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NOV. 2 BOSTON
NOV. 6 HOUSTON

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NOV. 4-6 WASHINGTON

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OCT. 5-9 LONDON
OCT. 19-23 DALLAS
OCT. 26-30 OTTAWA
OCT. 26-30 SAN FRANCISCO
NOV. 2-6 ST. LOUIS
NOV. 16-20 BOSTON
NOV. 16-20 LOS ANGELES
NOV. 16-20 WASHINGTON
NOV. 30-4 HOUSTON
NOV. 30-4 NEW YORK
NOV. 30-4 PORTLAND

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OCT. 5 NEW YORK
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OCT. 29 PLAINVIEW, NY
NOV. 2 LONDON
NOV. 2 ATLANTA
NOV. 5 TORONTO

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OCT. 26-30 NEW YORK
NOV. 2-6 SAN FRANCISCO
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'Mantis' Release Among Debuts at Show

(Continued from Page 1)

annual usage fee is $4,500. OS/DOS Mantis for CICS users with support for up to eight terminals costs $40,000, with $2,500 additional for installation and a $6,000 annual usage fee. Cincom is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

Graphics Tools

Boole & Babbage, Inc. announced high-resolution color graphics for its CMF, Resolve and VAM/SPF software packages. VAM/SPF reportedly includes full Synchronous Data Link Control support, multiple VAM monitor support and support for all IBM 327X screen sizes.

With the enhancements, prices for CMF range from $9,000 to $21,000, Resolve is priced from $10,000 to $16,000 and VAM/SPF is available for $25,000, Boole & Babbage said. The vendor is headquartered at 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

A new version of Oxford Software Corp.'s User Files On-Line (UFO) was also introduced at Software Info. UFO Version 2.4 is said to expand the power of non-CICS programmers to interactively design computer applications. Its new features include automated access to DL/1 data bases, an extended inquiry facility and a display definition extension.

The software is priced at $18,000 for DOS and $24,000 for OS versions. Oxford is based at 174 Blvd., Hasbrouck Heights, N.J. 07604.

Assembler Utility

Dataware announced a file compare utility called Filecomp, which is written in IBM assembler and reportedly utilizes a wide range of optional parameters. Report options are said to allow printing in both character and hexidecimal format, as well as full or partial record printing. The annual charge for Filecomp is $1,200; a perpetual license costs $5,000, according to the vendor at 2565 Elmwood Ave., Buffalo, N.Y. 14217.

DOS/VS and DOS/VSE versions of its Abend-Aid debugging tool were released by Tomark Software. They lease for $1,400/year. The vendor is located at 29433 Southfield Road, Southfield, Mich. 48076.

AVP Systems announced the release of Level III of the Sales/Use Tax System, which reportedly calculates all sales and use taxes in the U.S. and Canada.

Major enhancements include the ability to use the new nine-digit Zip Codes as well as geocodes as a key, the vendor said.

The System leases for $3,500 for the first year and $1,800 for each subsequent year, the vendor said from 237 Washington St., Marblehead, Mass. 01948.

Rounding out the new products at Software Info was Insac Software, Inc.'s announcement of Data-Man II, a data retrieval analysis and reporting system said to include file management capabilities designed for the end user.

Data-Man II was designed to run on IBM mainframes under OS, DOS or VS and reportedly performs data validation, file creation, file updating, data retrieval and the preparation of reports. It is priced at $12,750, the vendor said from Suite 3235, 2300 Peachford Road, Atlanta, Ga. 30338.

Infodata Distributes 'Inquire,' 'IQ/Net'

(Continued from Page 1)

130 vendors were ready and willing to help them.

IBM and most other hardware vendors were conspicuous by their absence. But Burroughs Corp. was here with its Ofis 1 office automation systems, and Data General Corp. had its Jenap accounting packages on display.

It was definitely a show for the software independents and a good number of them took advantage of the forum to announce either new products or enhancements to current packages. New offerings ran the gamut from McCormack and Dodge Corp.'s Hilite on-line inquiry system to a C language compiler designed to run on IBM hardware and introduced by Relational Software, Inc.

There were new products for mainframe environments — Insac Software, Inc. brought out Data-Man II for the North American market — and for micros — Focus announced Level 2 of its CIS Cobol program development system. Artificial Intelligence Corp. reintroduced the Intellect high-level query system with a strong emphasis on new multifile capabilities and multiple vendors brought out new versions of existing products (see related articles).

Software Selection

The wide selection of software on display was eagerly welcomed by serious DP shoppers. "In the old days, you worried about your hardware resources . . . you don't worry about that any more," was the way Clair McGriff, a management information systems manager with Vigortone Products Co., phrased it.

Arms laden with product brochures, attendees packed the aisles. "There's so much here, you wind up in a daze," said Robert Hedrick, a second vice-president of Northern Trust Co. Like most attendees, he solved this problem by confining his efforts to collecting product data.

In addition to the exhibits, in-depth overviews on various categories of software packages were offered in a separate conference program. Attendees could study the pros and cons of DBMS, graphics, financial, insurance, banking and manufacturing packages during concurrent three-hour sessions that were interspersed throughout the conference.

These overviews drew a relatively small crowd and the reviews were lukewarm. The minicomputer software session, for example, was "mostly a reinforcement of what I already know," according to Bob Goroff, a field systems analyst with Kemper Insurance. An industry observer from the East Coast who preferred to remain anonymous maintained that "the sessions had no content. . . It is a waste of time."

More favorable reviews were received by the Software Info Institute Series Seminars, held one day before the exhibition opened. "Selecting Application Packages" was probably the favorite in terms of attendance. However, seminars offering guidelines for selecting DBMS packages, contracting for packaged software and strategic MIS planning all had devotees.

M&D Brings Out 'Hilite,' On-Line Query System

(Continued from Page 1)

guage that allows query against McCormack & Dodge's G/L Plus, F/A Plus and A/P Plus data bases and includes a variety of systems functions such as search options. It also allows the user to determine display fields, data requirements and field names, the vendor said.

Ad Hoc Inquiries

Hilite is particularly adapted to nonstandard ad hoc inquiries, John Landry, vice-president of research and development, noted.

It would, for example, allow the user to display the contents of a specific journal voucher from the general ledger data base. It could also provide information from records in the fixed-assets data base on all assets purchased during a given year which cost less than a user-specified amount of money , he said.

The primary product benefit is that it provides quick answers to spontaneous questions usually asked by accounting personnel, Landry said. Emphasizing that the product does not pass the entire data base in its search for a particular record, he explained that Hilite utilizes an inverted list file structure to optimize the search task.

Tailored Information

Utilizing a data dictionary, Hilite users can tailor information to meet individual requirements; McCormack & Dodge pointed out that the dictionary allows maintenance of information separate from the main financial data bases.

The system's master screen provides answer sets in a fill-in-the-blanks format; answer screens can be scrolled backward and forward during information display, according to the vendor.

Noting that Hilite currently interfaces only with McCormack & Dodge products, Landry said plans were under way to release a version of the software to provide access to other types of files. He estimated this version would be released in three to six months.

Available immediately, Hilite costs $10,000 for interface to each of the three M&D financial products. It can be tied to all three products for $25,000. McCormack & Dodge is at 560 Hillside Ave., Needham Heights, Mass. 02194.

Attendance Doubles

(Continued from Page 1)

Utilizing the facilities of IBM's Systems Network Architecture (SNA), Inquire and IQ/Net interface directly with ACF/Vtam. "Our corporate decision to stay with standard access methods extended to networking protocols," Robert Schreier, executive vice-president, noted. "We left the network communications to SNA."

This first version of Infodata's distributed data base software puts into practice the company's belief that initial distributed networks will be loosely coupled, Schreier continued. "Each node is responsible for local data base maintenance with retrieval available globally. As IBM communications software evolves, Infodata will correspondingly evolve our [distributed data base] software into more tightly coupled software," he said.

Live Demonstration

The live demonstration of the distributed data base software was a joint project between Infodata and Boeing Computer Services Co. (BCS) via BCS' network. Information was processed from data bases at three nodes: an IBM 4341 in Seattle; an IBM 3033 in Kent, Wash.; and another 3033 in Washington, D.C., 3,000 miles from the other two locations.

Unmodified SNA ACF/Vtam network control program software was used for communications support, Infodata said.

Using the Inquire and IQ/Net distributed data bases at these locations, local inventory data at each of the three nodes was combined with corporate cost data located at the Seattle node. With BCS' equipment records management system as the basis, Infodata called up screens of inventory items located in each specific node and also searched for particular inventory items through all the nodes in the network.

It was possible, for example, to access inventory information about IBM 3277 terminals at all three sites via commands issued from a terminal standing in the middle of the Software Info exposition center in Chicago.

Planned Implementation

In conjunction with the announcement of the distributed data base versions of Inquire and IQ/Net, the vendor introduced a mechanism for corporations interested in distributed data base processing that would allow planned, phased distributed data base implementation with Infodata software.

The implementation of distributed data base processing normally takes place over a multiyear period, according to Kaplowitz. Companies that are planning to install some combination of the two software systems will be eligible for volume discounts as their networks come up, he said. IQ/Net prices currently start at $50,000 per CPU and Inquire costs begin at $70,000 per site.

The initial distributed versions will be released in 1982 from Infodata at 5205 Leesburg Pike, Falls Church, Va., 22041.

Software on Micros

Revolution Predicted in Big Firms

By Rita Shoor
CW Staff

CHICAGO — There is a revolution brewing in large organizations and the fomenters will be using software packages running on their own personal computers.

The prediction came from Peter A. Cunningham, president of the Input market research organization and a feature speaker at the Software Info conference here last week.

Borrowing some imagery from Alvin Toffler, Cunningham maintained that personal computer usage is embarking upon its own "third wave." The first wave of users were programmers and hobbyists. Then small businessmen took over personal computers to help keep track of their companies during the second wave.

The third wave of personal computer users comes from a totally different environment, according to Cunningham. They are the ever more demanding end users in very large organizations who want more information. These people are "storming the walls" of the DP establishment fortress first with minis and now with microcomputers to get what they want, he said.

Software packages designed for personal computers are "coming of age" to meet this new wave of end users, Cunningham claimed. "The concept of 'toy' personal computers is long gone" when viable vendors like IBM and Xerox Corp. are entering the market, he said.

Functional Move

The functional move away from a totally centralized DP organization working with a mainframe computer in an isolated environment is illustrated by the results of an Input survey examining personal computer usage in large organizations.

User departments in these Fortune 500 companies were handling their own program maintenance with application software that was largely hardware-independent, he said. Approximately 60% of these user areas had programmers working outside the central DP department, and he expected that number would increase to 100% "in the near future."

A surprising 50% of the DP managers in the companies "actively encouraged" the use of personal computers within the organization, Cunningham said.

Based on these indications, Cunningham predicted a $5 billion market in personal computing within Fortune 500 companies in the next five years.

Noting that there are some 2,000 listed sources for micro software packages, Cunningham said that many of the vendors are "not traditional companies." Relatively few of these firms are viable in terms of support, documentation, reliability and development, he warned. However, he expected the companies that are strong in these areas to grow rapidly into $50 to $100 million entities.

Personal computing software packages for such traditional applications as accounting, payroll, inventory management and statistics are currently available, he said. But contemporary applications like text processing, electronic mail, planning, forecasting and education are "much more in tune" with the micros, according to Cunningham.

CW Photo by L. Paul

Peter A. Cunningham

'Intellect' Gains New Abilities

CHICAGO — Artificial Intelligence Corp. (AIC) reintroduced its IBM-compatible Intellect retrieval software here last week at Software Info, claiming the package now has full capabilities that include multifile parameters.

Originally announced last fall, Intellect reportedly accepts queries that are expressed in conversational English and produces responses to them also in English. It understands each user's particular vocabulary, linguistic style and external view of the data base by means of an expandable lexicon, AIC said.

The package's multifile capability enables it to relate several files in a data base management system (DBMS); the first release of Intellect could only work with a single file.

Versions of Intellect are available for use with IBM's Vsam, Software AG's Adabas and AIC's derived file access method DBMS. Intellect is priced between $47,000 and $62,000 for end users; OEM pricing is also available.

AIC is based at 200 Fifth Ave., Waltham, Mass. 02254.

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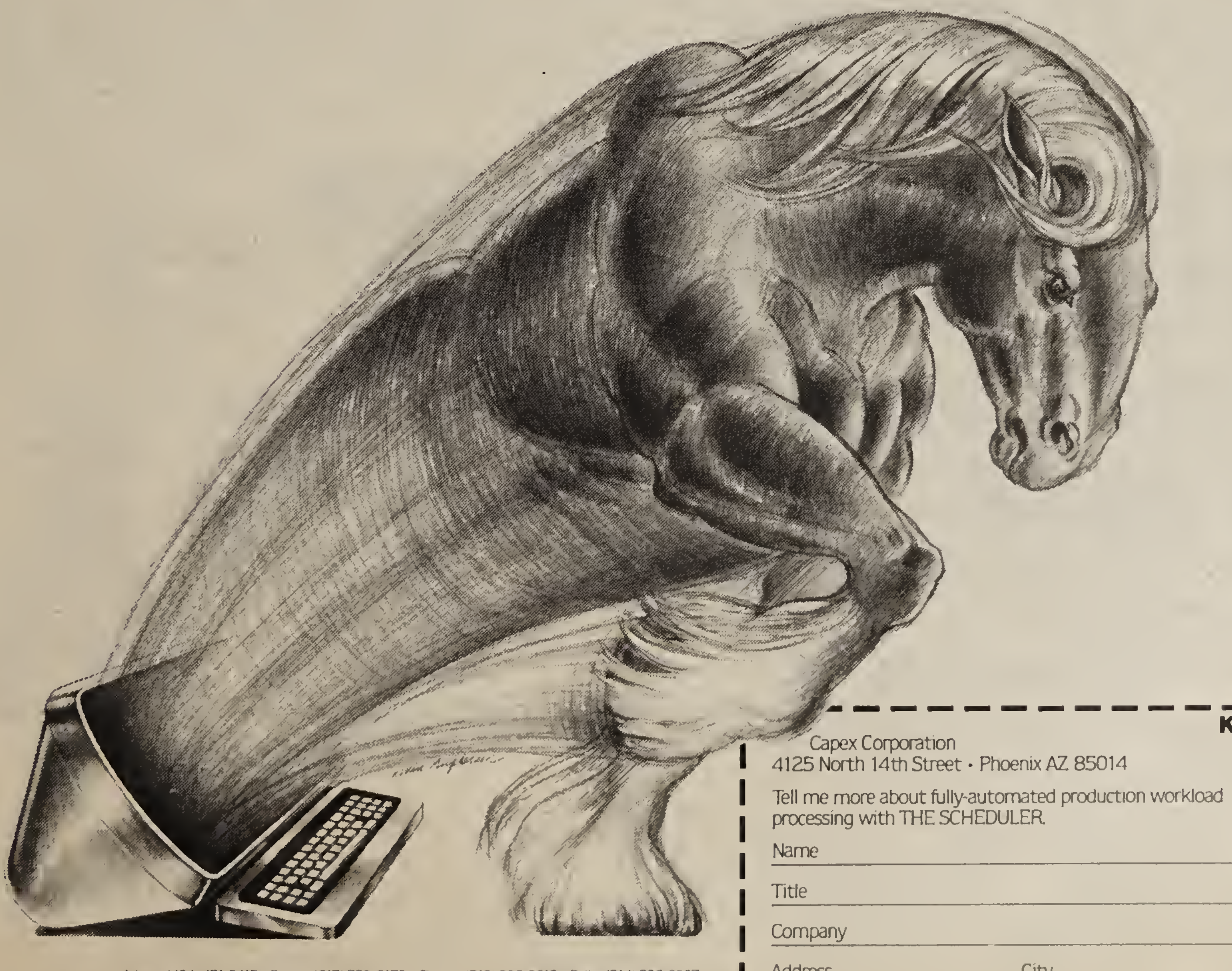

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Organized Crime in High Tech Black Market

(Continued from Page 1)

nized. Linked together by modern telecommunications, backed by sophisticated computer-assisted inventory and accounting systems, and complete with offshore bank accounts to conceal profits, some electronics underworld operations have reached a level of coordination and business efficiency that legitimate companies might envy.

But whether this underworld is, in turn, dominated by more traditionally organized crime groups such as the Italian Mafia is another question. A close look at the public record indicates that there is clearly some participation by the Mafia and other established organized crime groups in the electronics underworld; however, these groups do not dominate the illegal trade in stolen chips — at least for the moment. Furthermore, not all the rumors of Mafia involvement are true.

Mafia Connections?

Several hints of Mafia connections have been raised in police investigations of stolen microcomputer chips. Andrew Licari, secretary-treasurer of Solid State, Inc. of Bloomfield, N.J., is alleged by law enforcement sources to be influential in the numbers rackets in Essex County, N.J., a long-time Mafia stronghold.

Solid State, a $5 million per year importer/exporter of computer components, has been probed by investigators from at least three police agencies in connection with black market sales of stolen chips on the international market. Licari himself has two gambling convictions and was the target of a bizarre 1975 kidnap plot that sought to extort $100,000 ransom for his return.

Solid State's subsidiary, Electronics Barn in Bloomfield, N.J., was raided six months ago by police seeking stolen typewriters. Sources within the New Jersey police department admit that they were also seeking evidence of computer components taken during two robberies at Patronics Corp. in Fairfield, N.J., during November and December of 1980.

As it turned out, the company had purchased stolen typewriters, police said, but had bought them from a reputable dealer and had not known they were stolen. No components were seized during the raid, and no charges have been brought against Licari or Solid State. The more than $185,000 in germanium transistors and circuit boards stolen from Pantronics has never been recovered.

'Despite the thin — or nonexistent — evidence of Mafia involvement in the Intel chip case, there is an undercurrent of fear among some convicted traffickers in stolen chips that is not easily explained away.'

Licari insists that his company "has never been caught with a counterfeit chip. We check and double-check everything that comes in."

He has "no relations" with either the numbers racket or the Mafia, he said, but is the target of these accusations because of his Italian heritage. "You can't stop people from talking, but I have nothing to hide."

Another person accused in public records of being linked to the Mafia is Terry Koosed, a consultant to Mormac Microtechnology, Inc. of Tarzana, Calif., and officer of Unidata Investments, Inc., the holding company that owns Mormac. Mormac was named by California state authorities as a source of the stolen Intel Model 2732 chips.

Koosed was said to have a 150-foot yacht, bought with Mafia money, aboard which stolen chips were marked with counterfeit trademarks. This allegation came from five-time convicted felon John Jackson — himself implicated in thefts from Intel [CW, Sept. 7]. Jackson's accusations, made from his jail cell, resulted in warrants sworn out to search Mormac and other companies alleged to have handled the hot chips. These searches eventually led to the indictment of Mormac general manager Patrick Ketchum on charges of trading in stolen chips.

But few facts on the public record support the allegations of Italian Mafia ties to Koosed. California state investigators failed to turn up any evidence that Koosed has ever owned a boat — 150 feet long or otherwise. ("You can't get me out in those things," Koosed said. "I get violently seasick.")

No charges have been brought against Koosed despite months of police investigation. Koosed also argues that his associate, Pat Ketchum, is being "railroaded" by police, as he put it, who believed Jackson's allegations rather than Mormac's sales documentation concerning the stolen Intel chips.

Despite the thin — or nonexistent — evidence of Mafia involvement in the Intel chip theft case, there is an undercurrent of fear among some convicted traffickers in stolen chips that is not easily explained away.

In the Intel case, for example, one key law enforcement source reportedly admitted to prosecutors that he had provided Space Age Metal Products of Gardena, Calif., with Intel chips that both he and Space Age Metals' chief Arthur Klein knew were stolen. This allegation — if true — provides an important link in the chain of evidence leading from the thefts at Intel to the purchase of stolen chips by the powerful West German corporation Siemens Corp. during 1979.

But the informant has told prosecutors that "I'm not going to testify agianst the Kleins — they'll smoke you [kill you]," according to two sources involved in the case. Other informants have made similar comments about the Kleins (Arthur, the president, and his brother Daniel, Space Age Metals' vice-president). The informant's refusal to testify has seriously weakened some aspects of the government's case.

The informant is presently in prison and could not be reached for further comment. Daniel Klein has denied any knowledge of trading in stolen chips or any other activities outside of normal business practice.

Truck Hijacking Ring

Another case, apparently unrelated to the theft of Intel chips, has yielded considerable evidence of an Italian Mafia presence in the electronics underworld that preys upon the computer industry. Earlier this year, Massachusetts police broke a truck hijacking ring that was allegedly responsible for stealing almost $1 million in computer equipment from Codex Corp. The ring was uncovered by the FBI through telephone tags placed on alleged members of Raymond Patriarca's New England Mafia "family."

According to Massachusetts state investigator Robert St. Jean, the ring that victimized Codex included at least one former Codex employee. The thieves were not "made men," he said, which means they were not actual members of the Mafia. Instead, they were allegedly working for a Boston syndicate run by Gennano Anguillo, which is in turn dominated by Patriarca.

Such a chain of command — which separates and isolates "made men" from "foot soldiers" — is typical of Italian Mafia involvement in truck hijacking, drugs and other illegal activities, St. Jean said.

Strong Attraction

The magnitude of profits possible from ripping off the computer industry is enough to attract any smart crook, whether or not he is involved with the Mafia.

A 1980 survey by the *San Jose Mercury News* concluded that losses from thefts of integrated circuits total over $20 million per year in Silicon Valley alone. The value of losses from thefts in the computer industry as a whole is unknown, but is measured in the tens — and perhaps hundreds — of millions of dollars each year. The high value and compact size of most computer equipment makes it "a natural" for thefts by organized crime, according to Customs agent Chuck McLeod, a close observer of the industry.

However, so far the Mafia does not appear to dominate these ripoffs. Lt. Robert McDiarmid of the Santa Clara County Sherrifs Department's Organized Crime Section argues that "we have not seen a lot of Mafia activity out here."

Simpson is a free-lance journalist based in Washington, D.C.

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UK Mainframer Predicts

Automated Office to Ease Data Entry Drudgery

By Jeffry Beeler
CW West Coast Bureau

LAS VEGAS — Automated office systems will relieve business of many of its current data entry and other clerical burdens and greatly expand the extent to which customers can serve themselves, according to the managing director of a UK-based mainframe vendor.

Speaking at last week's fifth annual Data Entry Management Association (Dema) Conference here, Michael Aldrich of Redifon Computers Ltd. portrayed a future in which companies will transfer to their customers many of the order entry and processing tasks that have traditionally been done by the firms' employees.

Supermarket Comparison

This expected movement toward customer self-service is analogous to recent changes in the way shoppers are served in supermarkets, Aldrich said.

In the past, grocery store patrons could expect to be waited on hand and foot by clerks who selected each item, packed the goods and then took the customers' money. Today, the old-fashioned ideal of personalized customer service has fallen victim to high-volume supermarkets where shoppers pick all their own groceries, cart them to the checkout counter and sometimes even do their own bagging.

With the advent of electronic office systems, the supermarket principle of customer service can now be extended to many other types of businesses as well. In fact, in a few companies at the technological forefront, the do-it-yourself service concept is already in a relatively advanced stage of implementation.

"In the banking industry, for example, cash dispensers are now doing the jobs that used to be done by tellers and the terminal operators are the depositors themselves," Aldrich said.

The notion of allowing customers to do increasing amounts of their own work has also found expression in Europe, where the emergence of videotex- and Viewdata-like systems has allowed technologically unsophisticated subscribers to dial a company's central mainframe, gain remote access to the firm's data base and enter as well as process orders through their home TV sets.

In addition to serving as an electronic shopping aid for consumers, videotex-like technology can be used to implement electronic mail and information retrieval systems and can form a kind of gateway between two or more cooperating processors.

"Videotex will revolutionize office organizational structures," Aldrich predicted, "and because it is based around television, it will be found in both the home and office."

Environment to Change

Another major impact of future automated office systems will be to dramatically transform the environment in which managers and their support staff do their work.

Conventional office systems forced white-collar personnel to come together under the same roof to do their jobs and thus contributed to the rise of today's large centralized business workplaces. Future generations of automated office systems, by contrast, will allow the same employees to do much of their work at home, where they will be able to interact with their companies' remote mainframes through their own personal computers or terminals, Aldrich said.

Rapidly rising transportation, energy and rental costs will hasten the day when "it will be cheaper to take the work to the worker rather than vice versa," he added.

The transition from centralized to distributed working environments is already beginning to manifest itself in many cottage industries and the advent of the so-called "cottage office" will soon become an accomplished fact. "Flex-place is no more difficult to comprehend than flextime, and it need be no more difficult to implement," Aldrich said.

CW
At Dema

To realize its full potential, however, the next generation of automated office systems will require sound design, effective operator training, sensible operating disciplines and careful performance monitoring, he warned.

Such systems will also raise serious cost justification concerns — a development that will tend to slow the technology's public acceptance.

"The pattern of [automated office systems] use will probably be to install an integrated system for one function — distributed processing, word processing or even data entry — and then gradually expand it by adding other capabilities," Aldrich said. "It will be a stage-by-stage, learn-as-you-go process, with cost justification occurring at every step.

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IMSL Unwraps Fortran Tool for Non-DPers

By Robert Batt
CW West Coast Bureau

SAN FRANCISCO — A software tool claimed to achieve huge increases in programmer productivity was announced here last week at the Western Electronics Show and Conference (Wescon '81) by IMSL, Inc. The Problem Translator (Protran) will allow users to work Fortran in such a way that they can spend more time on problem solving, a spokesman for the Houston-based vendor said.

Protran was designed for use by scientists and engineers in large corporations, government establishments and universities working on IBM 360, 370, 4300 and 30 series mainframes, the Control Data Corp. 6000 and 7000 series and the Digital Equipment Corp. VAX-11 and Decsystem-10.

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"We feel Protran is going to revolutionize the Fortran industry," Thomas Van Denover, IMSL's marketing communications manager, said, "because whereas previously Fortran was such a hard language to learn, with our device you don't need to know it."

With Protran, a programmer can condense 30 lines of Fortran into one line of Protran, IMSL said. It claimed a recent independent study showed a 95% reduction in effort and a 90% reduction in lines of code compared with Fortran programs used to accomplish the same results.

As a result, coding that normally takes hours or even days could be shortened to expressive statements allowing the user to concentrate on the problems rather than the programming, IMSL said.

Two Models

Protran comes in two models: Statistics Protran and Math Protran. Statistics Protran, aimed at applications in the business community, offers current and efficient statistical analysis procedures. Math Protran, aimed at scientists and researchers, concentrates on providing accurate general purpose mathematical algorithms.

Protran, the vendor said, was designed to take shortcuts in math and statistics. For the sophisticated user, IMSL is making available its library, consisting of more than 1,500 direct subscriber installations and covering 100,000 users — mainly analysts and programmers.

Training to use Protran consists of reading a Protran manual; no prior programming instruction is required, according to IMSL.

Deliveries of Protran will begin Jan. 1. Statistics Protran costs about $2,500 and the Math Protran is priced at $3,000. Discounts are available for universities. IMSL is located at the NBC Building, sixth floor, 7500 Bellaire Blvd., Houston, Texas 77036.

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Destiny Hinges On Top Brass

(Continued from Page 1)

twice about asking the advice of the marketing director or controller, but they don't feel comfortable turning to a technically oriented person.

"What is combating the effectiveness of transferring information between the information and decision-making side of the house?" he wondered.

To overcome this perceptual weakness, information system executives must develop marketing skills that will enable them to sell the worth of their function to the chief executive officer, allowing them to compete for discretionary organizational resources in the same way other line managers are accustomed to doing.

Part of the selling process requires MIS directors to move away from the stance that they are offering an intangible to the position that their projects will help the bottom line of the organization.

Smis President Robert J. Jirout, who is vice-president and director of information systems and telecommunications for the Chicago Board of Trade, had to sell his boss on a $2.2 million communications switching system by demonstrating how the new system would contribute to the profitability of the organization.

MIS managers have been more associated with the rarefied atmosphere of technology than with being a team player on the front line of corporate management, according to Richard E. Dooley, president of Richard E. Dooley and Associates, Inc.

Pessimistic View

Offering a more pessimistic view was Paul Gaddis, dean of the business school at the University of Texas. He said MIS managers must "replicate" the scarcely demonstrated benefits of information systems to other areas of the corporation.

This will be difficult because line managers will claim they devised ways to make information systems benefit their operations, Gaddis charged.

This attitude undermines the attempt by MIS executives to be part of the mainstream management structure, he noted.

CW Survey Respondents Say No

Would Certification Ensure 'Moral' DP Staff?

By Brad Schultz
CW New York Bureau

Mandatory certification would not improve the moral character of DP professionals. Schools can influence the morality of people they train for DP jobs, but resumes do not show whether a DPer should be trusted with sensitive data.

Those are consensus views from 15 DP managers *Computerworld* reached by telephone last week. The managers run DP for four manufacturers, two banks, a gambling casino, a research company, a securities broker, an insurer, a retailer, a nonprofit testing service, a city government, a federal agency and a service company of a confidential nature.

Mandatory certification would prohibit practice of DP without a license. To be certified, a person would need to pass an examination and swear commitment to a code of ethics. According to advocates of the idea, DP is a socially critical practice; therefore, unscrupulous or inexpert DPers threaten society and should be barred from the practice.

A dozen of the 15 polled DP managers said mandatory certification would not improve the moral character of DP professionals generally. DP should not be compared with presently certified professions, such as medicine and law, because the latter involve dealings with people while DP involves dealings with systems, asserted Robert Richard.

According to the management information systems (MIS) director, certification may screen out inexpert DPers, but experts with unsavory characters could still be certified by giving lip service to an ethics code.

Certain Virtues

At Bird & Son, Inc. in East Walpole, Mass., Richard said he does not allow a member of his staff to access sensitive data unless the individual has already demonstrated certain virtues within Richard's jurisdiction. Other DP executives said they judge whether an individual should be trusted to control sensitive data by running background checks at the time of hiring.

At Harrah's, a Reno, Nev., casino and hotel, systems director James Beck said he wants to know why a job applicant left each prior job. Jerry L. Koory runs reference checks on applicants at Rand Corp., Santa Monica, Calif. But "there is no way to guarantee" that someone is trustworthy around sensitive data, the head of computer services added.

"There is no way to tell with certainty," agreed DP manager Glenn Greer at First National Bank of Shreveport in Shreveport, La. "I don't know how you do that," echoed DP director Allan Davis at Koch Industries, Inc. in Wichita, Kan.

At Gillette Co. in Boston, MIS director John D'Targiani said he tends to give staffs "the benefit of the doubt." At Burger King Corp. in Miami, Vice-President Eugene Daniels simply limits the extent to which anyone under him can control sensitive data.

Daniels also limits the extent to which Burger King's systems operations can be hurt by turnover. Asked whether a DP professional is morally obligated to complete an assignment on a complex software development project when another organization offers a more lucrative position, he said, "I'd like to think so."

But just to be safe, Daniels tries to limit the extent to which any software development depends on particular participants. At another company, Daniels followed a policy that any development project expected to last more than a year and a half or two years would be staffed with a deputy project leader nearly as qualified as the leader.

The former could therefore replace the leader, who otherwise would pose the greatest threat to the project from the standpoint of turnover impact.

Nine of the 15 polled managers said DPers are morally obligated to serve out software development assignments despite tempting offers from other organizations. Another two — Greer and E.F. Hutton's John E. Newe in New York — said that depended on how long the project was slated to last. If less than a year, then the DPer should stay, Newe stated.

Nearly all the managers said DP professionals are "morally obligated to refuse jobs that support, however indirectly, exploitation or injury of ordinary people." But most said that only the individual faced with such a prospect is qualified to determine its morality.

Finally, most of the DP managers said schools "could do much to affect the moral character of those they train for DP jobs." Some explained that DPers should take ethics classes; others said further exposure to the humanities would suffice.

But at the Educational Testing Service in Princeton, N.J., which plays a major role in how people get into U.S. schools, Kenneth Sharples disagreed. Schools cannot do much to prevent unscrupulous people from entering any of the trades or professions, he maintained.

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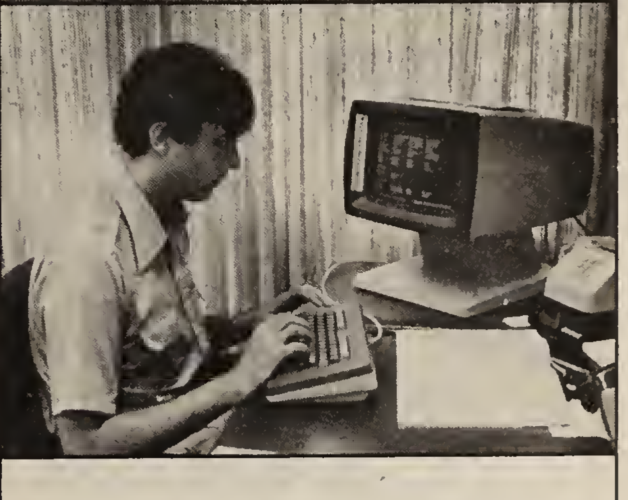

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Applications Emerging

Commercial DP Users Urged to Consider AI

By **Brad Schultz**
CW New York Bureau

NEW YORK — The time has come for commercial DP users to consider developing in-house applications of artificial intelligence (AI).

So said computer scientist and consultant Gregg Gibbons here last week at a Yourdon, Inc. seminar on AI applications. AI's presence in Yourdon's fall lineup of seminars for DP professionals may be as sure a sign as any that, as Gibbons put it, "the time has come to transfer this [AI] technology to the world at large."

AI is considered a province of computer science, although it stimulates and draws from other disciplines. According to Gibbons, AI is better defined in terms of its goals than its methods. These goals are to create machines that do what the human mind seems capable of doing and, in the course of creation, to better understand and harness what is called intelligence.

More specifically, AI systems go way beyond the functional capabilities of conventional computer systems — such as computation, searching for character strings and archiving units of text.

Among other things, AI systems may abstract logical propositions (or rules) from natural languages (such as spoken English); show that several propositions infer a particular proposition that would not otherwise be obvious; and employ heuristic methods ("rules of thumb") to rapidly discover a good way to challenge an adversary in a complex context.

The last sort of capability suggests why the Pentagon's Advanced Research Projects Agency (Arpa) and the U.S. Navy have funded much AI research since the field was founded a quarter century ago.

Many American professors and graduate students are presently writing AI software for such purposes as outmaneuvering an attacking swarm of missiles, charting a ship's escape through a mine field and interpreting the purpose behind an enemy's frenetic deployment of armored divisions and infantry.

While military applications continue to develop, commercial applications are also emerging, Gibbons told DPers last week. For a few years to come, many users will have little need to develop or implement AI systems, but all DP professionals should monitor progress in the technology, he advised. It is difficult to predict when AI will break loose in the Cobol library.

The year mid-1979 to mid-1980 marks a watershed in AI applicability, Gibbons noted. Over a period of several months, the core of activity in a number of AI research domains shifted from universities to industrial research centers. Schlumberger Ltd., for example, a multibillion dollar manufacturer rooted in the petroleum industry, bought Fairchild Camera and Instrument Co. in 1979 for $253 million more than the chip maker's net assets.

The primary reason was to start an AI laboratory, Gibbons explained. At the time, Schlumberger's president and chairman, Jean Riboud, remarked that AI "will change the order of magnitude in the size of our business."

Also in that year, a group of prominent AI researchers left SRI International, Inc., the Stanford University spinoff venture, to form a robot company in a garage, Gibbons said. Only a year later, Machine Intelligence Corp. is spurning offers of venture capital funding at the rate of roughly once a month, Gibbons reported.

Another development: The U.S. Navy Research Laboratory launched a Center for Applied Research in Artificial Intelligence, funded at $25 million for the first year, the Yourdon lecturer stated. The National Aeronautics and Space Administration has also awakened to a dire need for AI systems, he added, which would drive exploratory space vehicles to the stars.

What does this mean for the DP manager with both feet on the ground and a general ledger application deadline to meet? Plenty, Gibbons continued.

AI can allow far more productive software development because the techniques associated with AI, usually implemented in a variant of Lisp, permit software writers to avoid planning for all possible sequences of inputs to the program in execution. This planning usually is a vexing aspect of software design because certain sequences of inputs can crash bug-ridden systems.

Lisp constrains the programmer to define a set of logical propositions that at least partially describe the environment in which the application must run. An AI software development system can infer other propositions from the set provided by the programmer; these propositions form the rules by which the system may work toward solving the programming problem.

AI Projects Cloaked in Security

By **Brad Schultz**
CW New York Bureau

NEW YORK — IBM, Hewlett-Packard Co. and Texas Instruments, Inc. have artifical intelligence (AI) projects proceeding under a heavy cloak of security, according to Gregg Gibbons.

The reason: mainly to improve production methods to the point where competitive vendors fall way behind in ability to advance product designs within a time frame, the Yourdon, Inc. lecturer asserted. Gibbons has worked in AI since 1963 and consults out of Carmel, Calif.

Xerox Corp.'s Palo Alto Research Center and Bolt, Beranek and Newman are also known for AI research contributions.

Based on his familiarity with the research interests of several people Schlumberger Ltd. hired away from SRI International, Inc., Gibbons declared that "Schlumberger is clearly in the AI business in a general way," not just to support its petroleum-related operations.

IBM has long withheld support for AI, Gibbons added, for two reasons. First, the public's anxiety since the 1950s about what "intelligent" systems might do undermined IBM's traditional interest in promoting public support for computing.

Second, AI systems would greatly simplify development and management of software, Gibbons said. IBM prefers that software be handled in a complex environment by several echelons of technical specialists.

When a company has a large corps of DP professionals, it generally attaches much credence to DP executives. And IBM likes to deal with high-placed DP executives.

Interlisp Tool

Last month, Xerox introduced an Ethernet-compatible computer system designed for development of AI software. Costing about $55,000, this Model 1100 "scientific information processor" features Interlisp, a powerful AI tool, and "is intended for use by research scientists in universities and large industrial research laboratories," a Xerox spokesman stated.

But Lisp, the lingua franca of AI, is available for less than $300 on microcomputers, such as those sold by Apple Computer, Inc., Gibbons noted. A Pascal-based system for AI software development called AL/X goes for $3,000 under a six-month license, he said.

Yourdon's one-day seminar on AI applications will be held in Dallas, Houston, St. Louis, Toronto, Ottawa and Pittsburgh, Pa. on Oct. 1, 2, 19, 21, 22 and 27, respectively. It will be held in Seattle, Phoenix, Denver, San Francisco and Los Angeles on Nov. 2, 4, 5, 20 and 23, respectively.

More information is available through Yourdon at 1133 Ave. of the Americas, New York, N.Y. 10036.

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NSA Chief Pledges Open DP Security Center

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The National Security Agency's (NSA) newly established computer security center will operate in an open and unclassified manner, according to the agency's director, who last week sought to dispel industry "anxiety" about NSA intentions.

Telling attendees at Compcon '81 that he wanted "to clear up any misunderstanding" about the purpose of the Computer Security Technical Evaluation Center, NSA director Lt. Gen. Lincoln D. Faurer said the agency has no desire to monopolize computer security research and development in this country.

"We will need to work cooperatively with the manufacturers," Faurer said at the international meeting of the Institute of Electrical and Electronics Engineers Computer Society (IEEE). "We cannot conceive of any condition," he added, that would require classification of commercially developed hardware or software.

Usually Secret

Charged with overseeing U.S. efforts to secure sensitive government communications and to break other governments' codes, the NSA's activities are, as a general rule, highly secret. Faurer defended placement of the computer security center in the NSA by noting "we're a large and very technical organization" and said the arrangement "can take considerable advantage of our work in related areas."

In-house computer security activities for classified Department of Defense (DOD) systems will not be available to the public, Faurer continued, but he said the center's work with computer manufacturers is meant only to advance the state of the art and not to give DOD control over commercially available products. Any other approach would chill government/industry cooperation in this area, he said, and be self-defeating for the defense and intelligence agencies that rely on NSA expertise.

He noted NSA has "heard some anxieties" from industry since establishment of the center was formally announced by Adm. Bobby R. Inman, deputy director of the Central Intelligence Agency.

Bitter Debate

Formerly head of the NSA himself, Inman was last year involved in a bitter debate involving the government, academia and the National Science Foundation over agency efforts to develop a system for NSA to review the results of nongovernment cryptography research prior to its publication.

Inman's announcement of the NSA computer security center raised fears in some quarters the agency was seeking similar control over commercial R&D for computer security hardware and software. Those concerns represent a misunderstanding of the center's purpose, according to Faurer, who told the IEEE gathering the center was set up as a concerted effort to advance the security of defense systems.

Tiger Teams

So-called "tiger teams" the government has used to test the security of sensitive systems "almost always succeed in obtaining access"— access that often goes undetected by system managers, Faurer said.

Furthermore, efforts to correct deficiencies found in those exercises almost always fail and often lead to system degradation, he said.

CW at Compcon '81

As described by Faurer, the center's work will concentrate on four areas:

- Research and development. NSA envisions an R&D program focused on technological gaps in current state of the art and dedicated to applying results to specific problems. Communications protocols and end-to-end encryption will be stressed, he said, as will promoting assimilation of research findings into commercial products.
- Assistance in DOD computer systems acquisition.
- Dissemination of computer security information. The center will consolidate available information on computer security and be active in public forums on the subject, Faurer said.
- Evaluation of commercial computer security products. NSA contemplates evaluation of commercial products against a general set of criteria, he said, which will involve expanding current work with manufacturers.

Correction

The Scorebox listings in "Flexibility Proves Key to Microdata Reality 4000" [CW, Sept. 7] omitted the figures for the Alpha Micro AM-100T and the Microdata 4000. The Alpha Micro AM-100T had a CPU-intensive test time of 45.2 sec and an order entry test time of 5.7 sec. The Microdata 4000 had a CPU-intensive test time of 239.7 sec and an order entry test time of 3.4 sec.

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IBM's 3380 Problems Delay Amdahl Support

SUNNYVALE, Calif. — Amdahl Corp. says it is ready to support IBM's MVS-SP Release 3 operating system, but has to wait until IBM irons out problems with its 3380 disk drives before it can offer a related high-speed channel feature for its 470 processors.

Amdahl is currently testing the Release 3 support package on one of its 470s equipped with the latest version of IBM's biggest operating system.

The Release 3 support package is expected to be available by Nov. 14 using the then current release of Amdahl's MVS/SE Assist program, which is used in conjunction with IBM-supplied emulation routines. The support package will run on the 470 and larger 570 line.

Amdahl said it can deliver the support package to most users by the end of 1982.

In addition to announcing MVS support, Amdahl took a jab at IBM's announced delays in delivering its 2G-byte 3380 disk drives by stating it cannot develop a speed-matching buffer until it sees a working version of the 3380.

Amdahl has already built a prototype of the high-speed channel feature, but it wants to wait until the 3380 is in its final form before the feature is announced, said Michael R. Clements, Amdahl vice-president for engineering.

An Amdahl spokesman said the firm would have the channel feature on the market shortly after IBM announced a revised delivery schedule, but declined to say exactly how long after that announcement.

SMIS Offers Seed Money For Research

DENVER — At its annual conference here last week, the Society for Management Information Systems (SMIS) announced it has set aside $35,000 to fund up to seven research proposals examining the critical needs of the information systems industry.

Under the direction of its research committee, SMIS selected seven key topics for which it will provide awards. The research must be completed by July 1, 1982.

For each paper selected, Smis will award a stipend of $2,500 and research expenses of up to $2,500 to support the project.

Seven Topics

Although the committee originally identified 27 areas of unmet information systems needs, it narrowed the scope of the project to seven topics.

These seven topics are:

- The improvement of accessibility to timely and accurate data by users, possibly without intervention by information systems professionals.
- The development of effective processes for aligning the information systems environment to the needs of the enterprise, integrating the functions of information, office systems and telecommunications.
- How to improve the information systems manager's ability to identify, select and maintain the skills needed to carry out the future responsibilities of the systems departments in the face of changing technological and organizational requirements.
- To understand and anticipate the consequences of new information systems on economics and technology, especially on the enterprise.
- To improve the productivity in application development and maintenance and to control the growing imbalance between the two.
- Improve the information systems manager's ability to meet the enterprise's future information needs.
- To develop techniques and standards for more effective portrayal of information to end users.

Proposals are due by Nov. 1 and final selections will be announced at the conference on information systems in Boston on Feb. 1.

A complete prospectus on the research program entitled "Critical Information System Issues of the 1980's," may be obtained from SMIS at Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

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Conference Keynoter Says

Japanese Productivity Begins During Hiring

By Marcia Blumenthal
CW Staff

DENVER — U.S. employers try to get the maximum from workers for the minimum price during the hiring process, but in Japan both worker and employer try to offer the maximum to each other.

That commitment is driving the productivity growth rate in Japan, explained Joji Arai, manager of the U.S. office of the Japan Productivity Center.

In his keynote address at the annual meeting of the Society for Management Information Systems (SMIS) here last week, Arai said Japanese employers view the hiring of a worker as a $2 million investment in light of the lifetime employment concept that lies at the heart of the Japanese economy.

Although the U.S. is not oriented toward the lifetime employment approach, Arai suggested U.S. employers could adopt the Japanese practices of training and worker involvement to help improve productivity, he said.

New workers receive two years of in-house training when hired and "in the first 10 years of employment, the Japanese worker gets 200 to 300 days of structured training," Arai said.

Retraining is critical, particularly because of Japan's move toward factory automation.

Japan invests 30% of its gross national product in new plants and equipment, compared with the 13% to 17% rate of investment of U.S. companies, Arai said. While automation sometimes leads to a reduction of up to 90% in the production workforce, many of Japan's displaced workers receive training as software specialists. Japanese employers have been setting aside up to two years to accomplish this retraining.

Besides training, Japanese workers participate in devising ways to meet their company's goals as part of Japan's quality circle concept of management.

Although U.S. information workers work in teams, the teams are often formed to solve a particular problem or for a specific project — generally for the benefit of the employer, these teams are disbanded at the end of the project.

However, Japanese workers view the quality circle approach as a continuing way of learning new skills that will enable them to move up in their professions, Arai pointed out.

In Japan the ratio in salaries between the highest and lowest paid employees is only about 1:7, so workers see the possibility of achieving a top management position and are open to learning the skills required to move ahead in their professions, he said.

Arai, however, did concede the Japanese business environment, in part, fosters the human resource commitment.

CW at SMIS

Whole New Approach to Management

By Marcia Blumenthal
CW Staff

DENVER — Robert A. Best decided to go to work for Toyota Motor Sales, U.S.A., Inc. because the company was "totally computerized."

What he got in the bargain was a whole new way of approaching management.

Although U.S. firms are not culturally equipped to adopt the much-heralded Japanese management style completely, they can emulate some of these techniques, advised Best, manager of corporate data services for the Japanese automobile maker.

Like its Japanese parent, Toyota U.S.A. has a lean management structure with "manager" the title held by most executives, Best told a receptive group of executives attending the annual conference of the Society for Management Information Systems (SMIS) here last week.

This structure cuts down on corporate bureaucracy and politics, Best noted, adding that all managers have the same size offices.

Japanese firms try to make employees feel like family, as if the office is an extension of their homes.

For example, employees at Toyota recently participated in picking out the office furniture, the color scheme and accessories for the new U.S. data center, Best said.

Participation in company events does not happen only once in a while, but continues throughout the year at parties held at the completion of projects or various incentive contests.

Data processing employees have ample training opportunities from in-house courses to travel to meetings and courses outside the firm, he said.

While this may sound paternalistic, employees respond to the continued demonstrations of corporate attention, according to Best.

Consensus Meetings

Another feature Best likes about the Japanese management style is the consensus method of decision making among top managers.

When he wanted to install minicomputers at all U.S. dealer locations, managers from various corporate disciplines held consensus meetings.

No decisions were made at these meetings, but when the meetings usually called by Best to iron out issues stopped, he knew the group had reached an agreement. This can take from two weeks to two months to happen, but no one loses face in the process.

When the decision is made the managers are ready to operate as a team, Best explained.

It is a very subtle process that takes some getting used to, Best allowed. While generally a pleasurable experience, Japanese managers can "do a Zorro" on you before you know what happened, but subtly, he conceded.

Best characterized the Japanese management style as having "no surprises," which he said cuts down enormously on political maneuvering. The issues and positions of colleagues are known well before a meeting is held, he said.

SMIS Awards Edelman First Prize for Paper

DENVER — Dr. Franz Edelman, president of Edelman Associates, Inc., has won the 1981 Society for Management Information Systems (SMIS) paper competition.

Edelman will receive $5,000 in cash for his prize-winning paper, "Managers, Computers and Productivity."

Prior to entering the independent consulting field, Dr. Edelman spent more than 30 years with RCA Corp., attaining the position of corporate staff vice-president for business systems and analysis. He is also the originator and initial designer of the Iris system, a high-performance method for information management in the area of human resources.

Second Prize

The $2,000 second prize went to Carolyn J. Mullins, Indiana University, and Dr. Thomas W. West, California State Universities and Colleges, who co-authored "Word Processing in a Major Corporation: Policies, Plans and Management."

Ashok Shenolikar of Harris Corp. won third place and $1,000 for his paper "An Approach to Structured MIS Development."

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Bell Nixed on Bid to Dismiss Antitrust Case

By **Jake Kirchner**
CW Washington Bureau

WASHINGTON, D.C. — The presiding judge of the government's antitrust suit against AT&T has denied the company's request to dismiss the case, saying the Justice Department has presented strong evidence AT&T did engage in improper anticompetitive practices.

While stressing he was not prejudging the major issues in the case, Federal Judge Harold H. Greene's 74-page decision on the dismissal petition must be comforting to the Justice Department trial team.

"The testimony and the documentary evidence adduced by the government demonstrate that the Bell System has violated the antitrust laws in a number of ways over a lengthy period of time," Greene wrote in his Sept. 11 decision.

"On the three principal factual issues" — alleging anticompetitive conduct by AT&T regarding connection of non-Bell equipment, Bell treatment of intercity services competitors and AT&T equipment procurement practices — Greene said "the evidence sustains the government's basic contentions and the burden is on the defendants to refute the factual showing made in the government's case."

But the ruling was not a complete defeat for AT&T, which in any case had little realistic hope, the judge would throw out the entire case. Greene dismissed three parts of the government's case against Bell. He ruled Justice had not sufficiently supported several contentions that:

- AT&T made false and groundless claims to the Federal Communications Commission (FCC) to use the commission's regulatory processes to delay and stifle competition.
- AT&T improperly monopolized procurements of its operating telephone subsidiaries by the sales practices of its Western Electric Co. equipment manufacturing arm.
- AT&T improperly set prices for its services in order to advance an illegal monopoly.

In his detailed discussion of the case's areas of controversy, Greene held the Justice Department has met its basic obligation to demonstrate AT&T did have a monopoly position in relevant markets and used its position to hinder competition.

He rejected AT&T arguments that some competitors failed through their own internal problems rather than because of Bell activities. Greene said "even if actual injury to a competitor was not caused by the conduct of defendants, proof of that conduct may still be relevant as evidence of their intent to discourage all competitors, large and small."

AT&T has argued the issues in the case are "properly within the exclusive jurisdiction of the . . . FCC and that [its] actions are therefore impliedly immune from the antitrust laws," Greene noted. The Justice Department contends Bell is still bound by basic antitrust law.

Substantial Dilemma

Relating that argument to the issue of whether AT&T illegally refused interconnection privileges to competing intercity service vendors, Greene wrote: "These differences in approach create a substantial dilemma. Adoption by the courts of the government's theory could well end up undermining the operation of the Communications Act, for the delicate mechanism by which the FCC determines which developments in the telecommunications industry might best serve the public interest would be thwarted if AT&T had continuing obligation to interconnect before the Commission had even had an opportunity to rule.

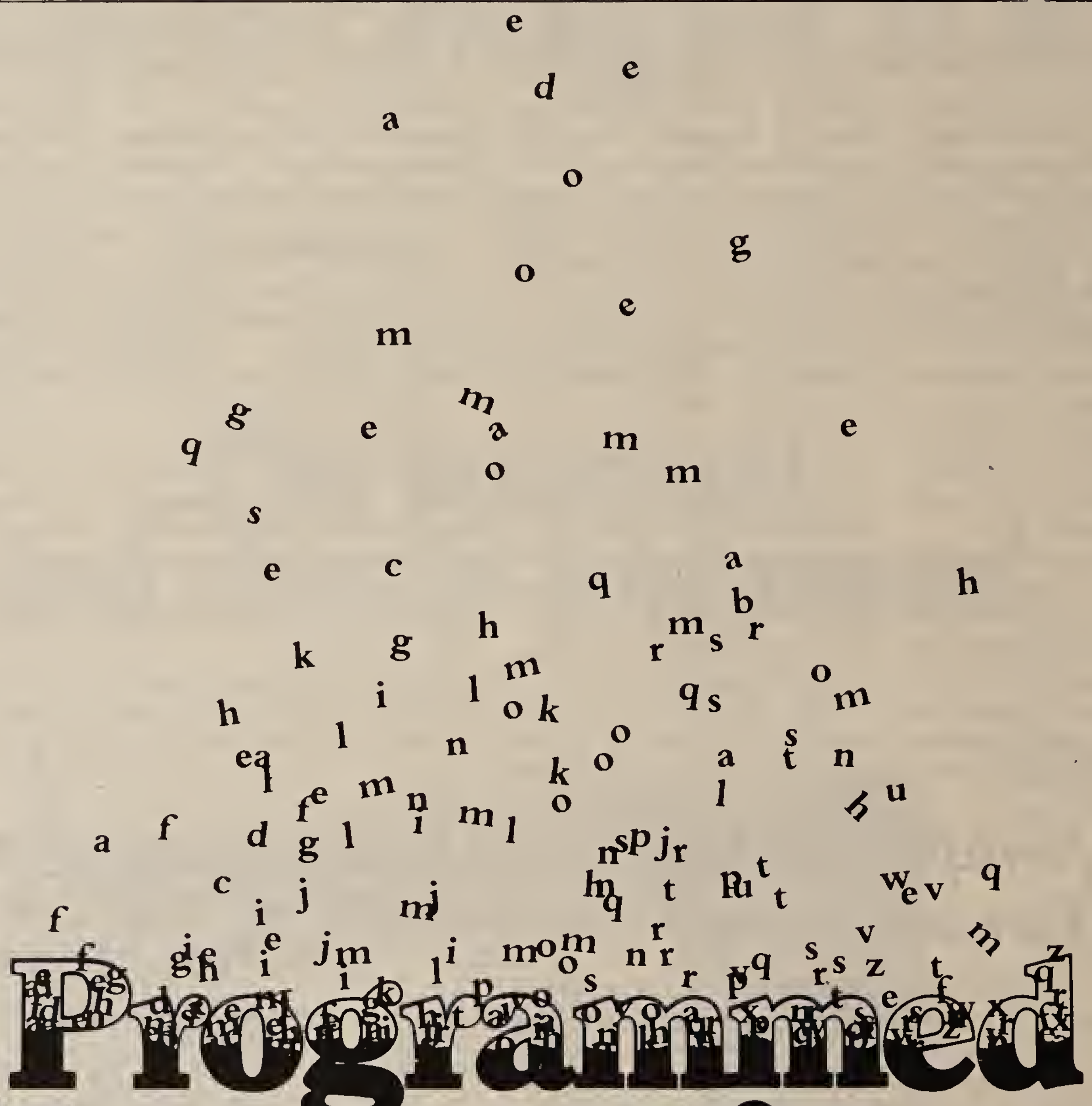
"On the other hand," Greene said, "if defendant's view of the law on this issue were ultimately to prevail, AT&T would, in practical terms, have achieved precisely the immunity from antitrust scrutiny which this court and many other tribunals have already rejected as not being consistent with the will of Congress." Greene deferred choosing at this time which view "is correct for the purposes of this case."

Seminar to Cover Computer Graphics

BOULDER, Colo. — A two-day seminar on independent computer graphics will be held here Nov. 16-17.

Sponsored by Precision Visuals, Inc., the course is intended for users, programmers, systems analysts and technical managers who design and implement application systems that use computer graphics.

The registration fee is $250 for the first attendee from an organization and $150 for each additional attendee, Precision said from 250 Arapahoe Ave., Boulder, Colo. 80302.



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SNA and IBM Personal Computer Seen Having More in Common Than Meets Eye

By Jeffry Beeler
CW West Coast Bureau

PALO ALTO, Calif. — Much attention has been devoted lately to IBM's just-introduced personal computer and its capabilities as a stand-alone business system. But little has been written thus far about how the product fits in with IBM's networking strategy, particularly with the Systems Network Architecture (SNA).

On the surface at least, SNA and IBM's first entry in the personal computer sector would seem to lie at opposite ends of the information systems spectrum.

The former, after all, is typically equated with large configurations and with geographically distributed processing, while the latter is usually associated with microcomputers and is viewed more as an autonomous machine than as a node in a larger network.

More in Common

However, SNA and IBM's first personal computer have more in common than might be apparent at first glance. To a great extent, the personal computer already meets the compatibility requirements for operating in an SNA environment, and in the next two years or so, the product's SNA capabilities are expected to be greatly enhanced. That was the prediction of Saroj Kar, president of TCT International, Inc., a Sunnyvale, Calif.-based consulting firm.

In its current version, the personal computer can serve as a teletypewriter look-alike — a capability that in turn enables the product to emulate IBM's 3767 display unit through the firm's Network Terminal Option, Kar said during a recent interview here. This teletypewriter compatibility provides a kind of doorway through which the computer can reportedly avail itself of all the existing releases of IBM's major application subsystems, including the widely used IMS and CICS.

However, future IMS and CICS releases are expected to be accessible only through more advanced communications protocols like IBM's System Data Link Control (SDLC) and 3270 bisynchronous transmission facilities. So to be able to take full advantage of anticipated performance improvements in IBM's large application subsystems, the personal computer's communications support will have to be significantly expanded beyond its current limitations.

The first of the computer's expected support enhancements will probably come next April with the addition of a 3270 bisynchronous communications capability, Kar predicted. Four months later, in August, the computer is expected to be further enhanced to emulate IBM's 3276 communications terminal and provide full SDLC/SNA compatibility.

The last of the computer's future enhancements is tentatively scheduled to take place in April 1983 and is expected to involve the addition of X.25 communications support, Kar said.

Kar's forecasts are reportedly based on product planning information obtained directly from IBM through unnamed outside sources. However, the plans are regarded as highly tentative and the timetable for the computer's projected enhancements is still subject to change, he added.

The acquisition of additional communications features will enable the personal computer to interact with large IBM host processors and thus gain centralized support for applications like data base inquiries and updates, program loading and updates and job monitoring, Kar said. However, at the same time the product is expected to retain all its capabilities as a stand-alone processor.

NRMA Meet Set For DP Retailers

HOLLYWOOD, Fla. — The 23rd Annual Retail Systems EDP and Communications Conference sponsored by the National Retail Merchants Association (NRMA) will be held Oct. 11-14 at the Diplomat Hotel here.

The conference will feature more than 50 sessions including nine sessions on the "human element" in data processing and eight sessions on cost savings ideas. The cost of registration is $295 for association members and $495 for nonmembers. Further information on the conference is available from NRMA headquarters at 100 W. 31 St., New York, N.Y. 10001.

Course Planned On IBM's Vtam

RIVER EDGE, N.J. — On-Line Software International will hold a course on IBM's Vtam access method during October, November and December.

The course, which will be offered in New York, is geared to programmer/analysts familiar with CICS/IMS systems; as well as programmers and others who need an undertanding of the Vtam process, the vendor said.

The course will be offered Oct. 13, Nov. 2, Nov. 30 and Dec. 14 and will cost $600. More information is available from the vendor at 65 Rt. 4, River Edge, N.J. 07661.

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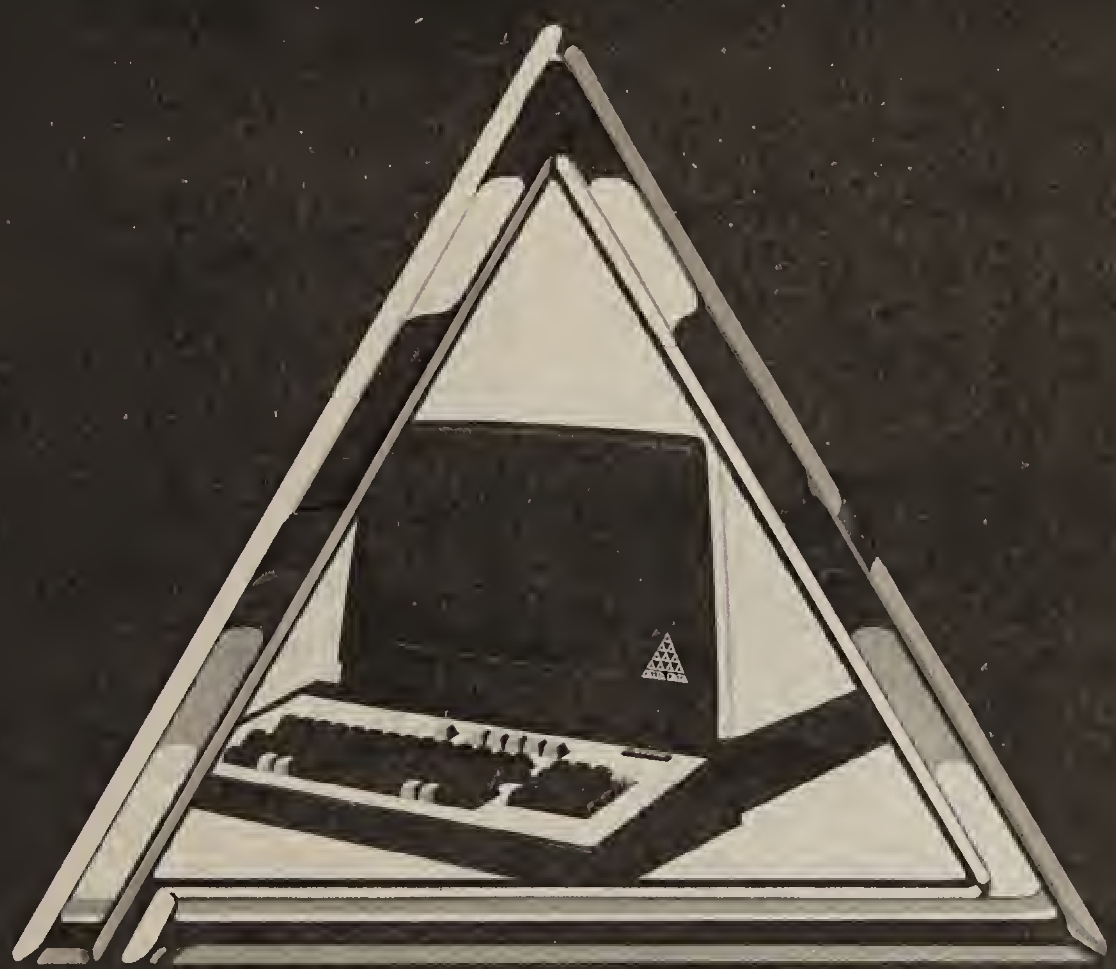

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Black DPer Breaking the Mold

CW at BDPA

By Bruce Hoard
CW Staff

PHILADELPHIA — Leonard Miller is a big, jocular, friendly guy who built his own DP business into a successful enterprise from the ground up. He is also black. "Successful," "business" and "black" are not words often seen juxtaposed. But Miller, founder and president of Dynamic Programs, Inc. (DPI), is breaking the mold. And he didn't even want to.

Interviewed at the third annual meeting of the Black Data Processing Associates (BDPA) here, he described taking an involuntary leap into the business world in 1970 when Donald Cogsville (currently president of the Harlem Urban Development Corp.) and Ernest Green (former assistant secretary of labor) appeared on the scene.

"They actually forced me into business," Miller recalled. "I didn't want to go."

Cogsville and Green had a dream ripe for reality. They thought it time for blacks with management ability to assert it by forming their own enterprises. Miller fit the bill, so they urged him to take a chance.

"Like most black entrepeneurs, I started out in social research," he recalled. For six years, he got along all right, working mostly for local, state and federal governments around Trenton, N.J., home base of DPI.

In 1976, he decided computers and electronics were the wave of the future, so he developed a computerized affirmative action tracking system for the New Jersey State Transportation Department. DPI still has the contract.

It seems fitting Miller would kick off his computerized services with an affirmative action program because discrimination is something he has spent a lifetime learning about.

Professionally, the president noticed that he had a better chance of landing jobs when accompanied by a white "systems analyst-type" rather than a black with the same qualifications. "That bothers me to this very day," he said.

The ironic thing about such a situation is that black DPers are as good or better than their white counterparts because they have to be in order to advance in large, white-owned companies, he said.

He claimed his company would be earning $7 million annually instead of $2 million if he had an all-white staff. "White people prefer to deal with white people," he said.

His company has entered into a joint agreement with System Resource Nigeria Ltd., a firm owned and operated by Nigerians. After traveling to the Nigerian capital of Lagos, he was able to secure an $8.5 million telecommunications project.

Asked why so few blacks are able to attain his status, he replied, "First reason, strange as it seems, is most black Americans believe in the American flag and apple pie. Blacks believe they can become president. That is false."

He said the second reason is, "Black executives in most industries that began making $30,000 a year and up see themselves making more than 95% of the black population at large" and become socially complacent.

Miller praised the BDPA, saying "The more people who join groups like BDPA, the more information there will be for entrepreneurs and black youth."

He predicted "Reaganomics" will cause a 60% bankruptcy rate in black-owned U.S. businesses. The Reagan administration is also hurting blacks by implementing debilitating changes in federal affirmative action requirements, he alleged.

Black businesses only want a chance, Miller said. "If a black firm is incompetent, fire us," he declared. "We're usually the last hired and the first fired anyway."

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Black DPers Told to 'Count on Themselves'

CW at BDPA

By Bruce Hoard
CW Staff

PHILADELPHIA — "Networking" was a word used frequently at the third annual meeting of the Black Data Processing Associates (BDPA) here recently. Not computer networking, but people networking.

It looks as though BDPA members have been practicing what they preach because attendance at this year's two-day conclave was way up, almost quadrupling from 48 to 168.

What the far-flung group representing seven chapters from seven cities heard was exhortations to count on themselves, not the Reagan administration, when it comes to getting ahead in their careers.

"We're back to helping ourselves with Reaganomics," said William H. Hawes, minority business development specialist with BHA Corp., referring to what he called "cutbacks" in government subsidies for minority-owned businesses.

Little Effort

Ellen Perry, president of The Trace Group, a New York City recruitment agency, was asked how much effort there currently is to recruit black DPers.

She replied "little or nothing" is being done now compared to 10 years ago and claimed many recruitment programs are "not sincere" because the Reagan administration has put affirmative action on a back burner.

Jack Gordon, general counsel for Smith Kline Corp., spoke forcefully about black self-initiative, telling his audience, "the main reason we don't get big business is because we don't demand it.

"Power gives up to nothing but power," he declared, "and you've got to insist upon it."

He cited the high pressure endemic to private industry and urged blacks to research markets thoroughly before starting business ventures.

The quotable Gordon offered another piece of advice: "If you want to do something for poor people, the thing to do is not be one of them."

The attendees also discussed the problems blacks have in dealing with one another in the business world.

"We don't trust each other and deal honestly with each other," Earl Pace, president of Pace Data Systems and national president of BDPA, said.

One member of the audience even went so far as to say middle-class blacks who have achieved a comfortable life-style will "turn you in" if given the opportunity.

Pace called on black consumers to support black-owned businesses. "When you spend that dollar, spend it at a minority-owned business so that business can hire more minority people."

"When are we going to wake up and realize that nobody is going to help us if we don't help ourselves?" asked Hawes.

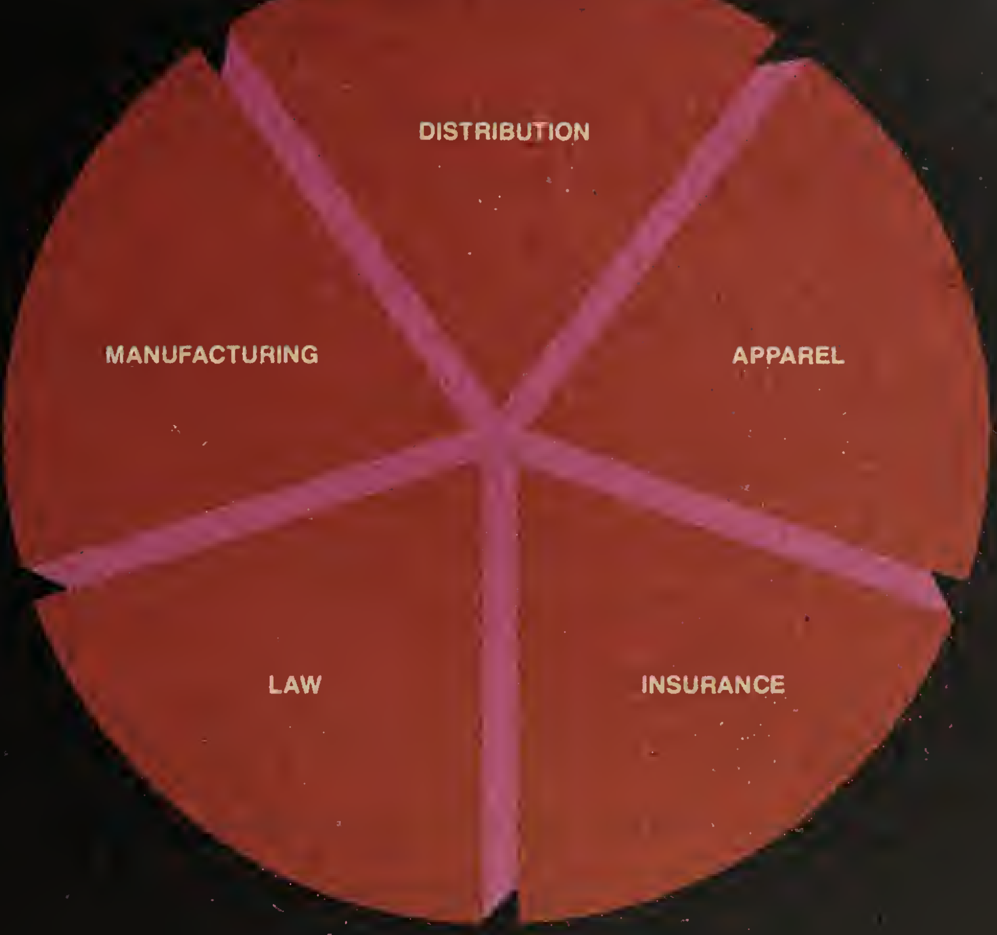
Other suggestions made by Pace and Hawes included hiring contract programmers to avoid paying full-time benefits, bartering DP services of management consulting and selling programs to vendors.

Robert Stewart, project manager of engineering development at Sperry Univac, told BDPA members to understand their organizations before trying to move up in them. He also recommended making key career decisions within the first three-to-five years on the job.

Addressing racial realities in DP, he said black DPers must be prepared to deal with managers who dislike them because of their color. The way to do that is by performing so well there is no room for criticism, he asserted.

Education is a key to upward mobility, Stewart explained.

BDPA can be reached through P.O. Box 7466, Philadelphia, Pa. 19101.



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Political Moves Go On-Line With 'Calliope'

By **Bill Laberis**
CW Staff

BURLINGTON, Vt. — A professor here has developed an on-line system designed to make a more exact science out of the imprecise Washingtonian art of congressional arm-twisting and political power plays.

Named for the Greek goddess of epic poetry, Calliope can document a U.S. House of Representatives or Senate roll-call vote within minutes of the final gavel, producing a 25-page legislator analysis of the vote.

For example, Calliope's analysis of a vote on abortion would include a listing of all single male legislators over 40 who voted against abortion, as well as all Catholic grandparents who voted in favor of it.

The idea is to give political party heavyweights, Democrats in particular, some ammunition to use the next time a related issue is debated and voted on, according to Prof. Garrison Nelson, Calliope's creator.

Democratic Advocate

"When it comes time to push a bill through, knowing a lot about how individuals or groups of individuals have voted in the past can make all the difference, as President Reagan has shown us," said Nelson, who described himself as a liberal Democrat. "I believe I have the biggest data base on legislative committee assignments in the country, and I'd like them [the Democrats] to use it to advance their goals."

Nelson has courted the Democratic National Committee as a possible customer for Calliope and said that the Democratic Campaign Committee, Democratic party leadership, *Washington Post*, *Congressional Reporter*, ABC and CBS news and United Auto Workers union have expressed interest in the system.

Nelson, who built his system on a Digital Equipment Corp. 2060 mainframe, said Calliope is the fusion of an analytical package and an interactive data base management system (DBMS). Programmed into Calliope are more than 60 personal variables describing the 535 senators and representatives in Congress including items such as race, sex, religion and marital status. The data base also has a listing of the more than 1,000 committee assignments in each house and the results of 400 roll calls of the present (97th) Congress.

Nelson said the results of any roll call vote, once loaded into the mainframe via remote terminal, are processed, analyzed and then accessed over standard dial-up lines. Users need only a terminal, printer and phone, he said.

"It might be very interesting for congressional leaders to know almost instantaneously who were the eight or so representatives over 65 who voted against Social Security," he said.

Nelson is currently looking for funds to add demographic data bases as well as roll call histories going back to 1977 to enable users to establish linkages between the members "to see who's been voting with whom."

The demographics data base, available through the U.S. Bureau of the Census, could be a valuable tool in evaluating the results of scheduled reapportionments of congressional districts, he explained.

Despite Nelson's obvious political leanings, the Republican Party may also benefit from his work. He said the GOP has hired away his best programmer, who is now on the payroll of the Republican National Committee and presumably developing a system similar to Calliope.

Meanwhile, Calliope is available to users of whatever political strain for about $1,500 to $2,500 per month, which includes regular program maintenance. Nelson said the price will vary greatly depending on the number of clients in a given area (he is supplying a foreign exchange line to users or groups of users), the user's proximity to Vermont and the number of data bases selected.

Nelson's Polimetrics Association is located at 29 N. Willard St., Burlington, Vt. 05401.

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Voluntary Guidelines

U.S. Firms, Trade Groups Back Privacy Rules

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Four dozen U.S. corporations and trade groups have voiced public support for a set of voluntary privacy guidelines developed last year by the U.S. and its major trading partners, the Commerce Department said recently.

While not overwhelming in length, a department official said, the roster constitutes a "very significant start" in manifesting support for the privacy guidelines. The list will be presented at an international meeting in Paris next month despite objections from some quarters that its widespread public disclosure may embarrass U.S. multinational corporations not included.

The list results from efforts by Commerce's National Telecommunications and Information Administration (NTIA) to garner support for the guidelines, which address automated personal records. NTIA is charged with demonstrating to the international community the extent of U.S. concern for privacy protection.

NTIA and the State Department are hoping a ground swell of private sector support for the guidelines will help U.S. negotiators stave off strict data protection legislation in prime overseas markets [CW, July 6].

Meeting Planned

At an Oct. 5 meeting in Paris, NTIA will present its list to the Organization for Economic Cooperation and Development (OECD), which developed the guidelines after several years of negotiations. The agency is also preparing for the meeting a report detailing U.S. privacy protection in its various forms — from accepted business practices and common law to state and federal statutes and constitutional guarantees.

The object of the paper, according to NTIA, is to show that, although the U.S. does not have omnibus privacy statutes corresponding to those of many European countries, individual privacy is guaranteed by a broad range of laws and practices at many different levels of American society.

The list of privacy guidelines supporters contained 48 entries as of early this month, including several major DP/telecommunications companies such as Perkin Elmer Corp., RCA, Texas Instruments, Inc., NCR Corp., Hewlett-Packard Co., IBM Corp., AT&T, Xerox Corp. and Control Data Corp.

While such major international service providers as American Express Co., Citibank and Chase Manhattan Bank are on the list, NTIA official Jane Yurow said no attempt has been made to determine how much international information flow is represented by the companies supporting the privacy guidelines.

At a recent State Department meeting on the subject, Yurow also indicated a number of additional companies and trade associations are actively considering whether to publicly embrace the privacy principles in the OECD document.

It was noted at the meeting that other OECD members may not be terribly impressed with the list because more than 750 companies and associations have been directly contacted about the guidelines by the secretaries of Commerce and State of the last two administrations.

It was also suggested that companies not represented on the list may find their absence embarrassing when the list is presented in Paris.

Although she agreed with the comment, Yurow said it would be impossible to suppress the information. She urged any company that is considering the guidelines to make that known to NTIA and said that information will be included in the U.S. presentation in Paris.

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Head to Head on Demo Project

EDS, CSC Lock Horns Over Army Contract

By Bill Laberis
CW Staff

WASHINGTON, D.C. — Two giants of the computer service business have locked horns over what may be the most lucrative service contract ever, the U.S. Army's Project Viable (Vertical Installation Base Line Equipment).

Computer Sciences Corp. (CSC) of El Segundo, Calif., and Electronic Data Systems Corp. (EDS) of Dallas are each working on $5 million demonstration project contracts awarded them in July, the first phase of the bidding war. The victor will be crowned next summer, and the spoils include a 10-year contract that could run as high as $1.5 billion.

Each company is presenting itself as part of a hardware-software team. CSC is entering the fray along with IBM, whose older mainframes the Army is seeking to replace with newer models, and EDS is paired with Amdahl Corp., a leader in the plug-compatible manufacturer market.

The successful bidder will be charged with the responsibility of providing all DP resources for 47 major Army installations across the U.S., with options for another 23 bases.

"But the really significant thing, apart from the huge size of the contract, is this represents an acknowledgment that, in most instances today, a greater share of the total resources goes into the software and operating end," an EDS spokesman said.

"The idea of having the software developer build the system and then wrap the hardware needed around it, rather than doing the opposite, is a telling sign," he said.

A CSC spokesman echoed the same sentiment, saying, "It's about time the government and big users went to the service companies that make the product to fit the need, rather than going to the hardware manufacturers and later trying to develop software to lay over it."

Government Business

CSC already holds numerous defense and aerospace DP service contracts and views the procurement of Viable as a chance to "greatly broaden a beachhead in the federal area," according to Jim Furlong, manager of corporate communications.

EDS is similarly seeking to "expand horizons in the federal contract arena," a spokesman said. EDS has dealt largely in the private sector's financial and insurance markets and holds contracts for the processing of private and public medical insurance claims in several states.

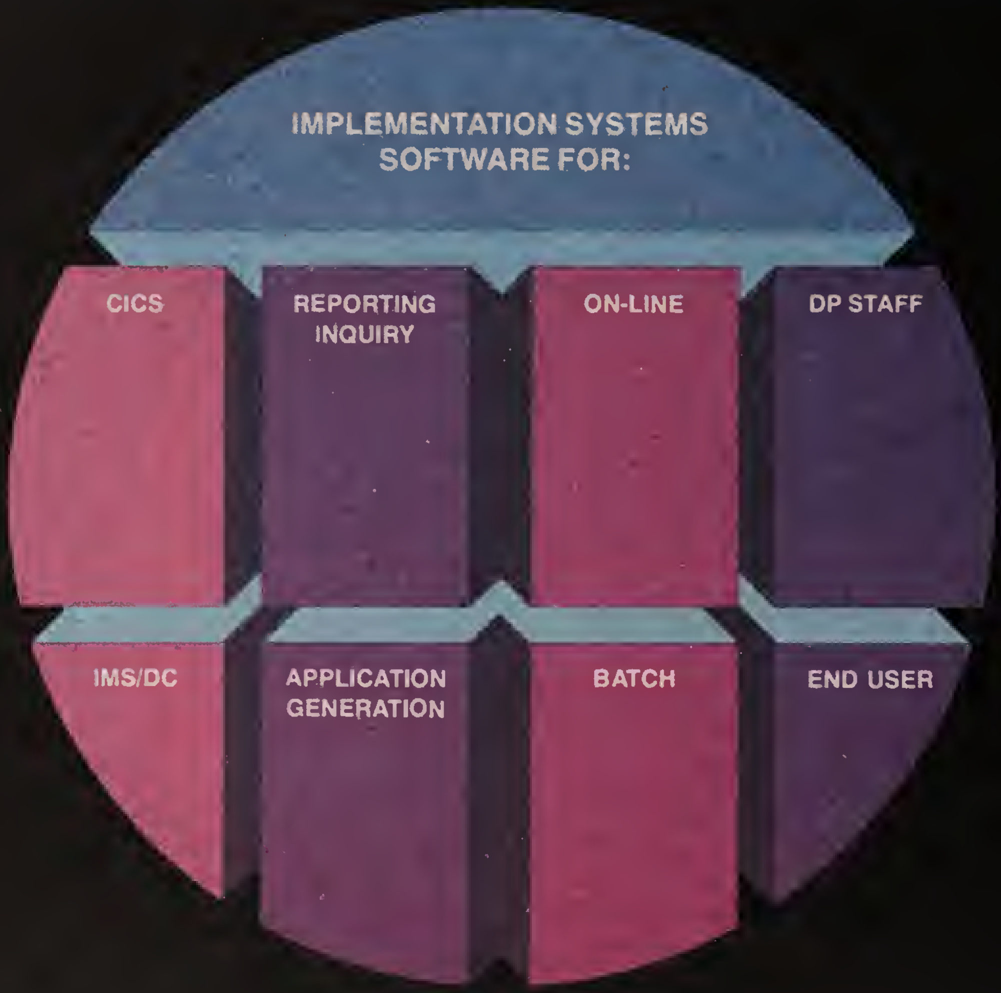
The system will cater to the administrative, as opposed to the tactical, needs of the Army and will include design of application programs to support the expansive financial, logistics and personnel systems at the bases.

Viable will provide for anticipated growth in the Army's DP needs over the next decade, as well as for "significant redundancies in system architecture in case of emergencies," EDS said.

The Army has not developed any estimates of just how much will be saved in letting out its base DP functions to private vendors, nor has it announced an anticipated final cost.

"Cost is a very, very sensitive area, although it could run over the $1 billion figure over the 10-year life of the contract," Lt. Col. Bill Watts, Army deputy project director, said. "I also can't say whether we'll see more centralization of DP functions or more distributed processing. That is entirely up to the vendor."

Watts explained that the "A-109" procurement status of the contract means, in essence, the Army has described its DP problems to the bidders and it is now up to them to develop a workable solution with their demonstration projects.



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Managers on the Move

Bob E. Martin

BOB E. MARTIN has joined Aloha Airlines, Honolulu, as manager of systems programming.

Martin's responsibility will be to maintain and implement vendor supplied software programs. Prior to this appointment, Martin was a systems programmer with Central Pacific Bank.

Martin attended Northwestern University and The Business Methods Institute in Chicago.

•••

SAMUEL A. MALEK has been named a vice-president and division manager of telecommunications and software consulting services at Security Pacific National Bank in Los Angeles.

Malek holds an M.B.A. in management sciences from the New York Institute of Technology.

•••

PAUL MacKAY has been appointed manager of software development and support at Continental Information Systems, the new software division of Continental Resources, Inc., headquartered in Bedford, Mass.

Most recently, MacKay worked as manager of product management and support within the marketing arm of Art Benjamin Associates of Ontario, Canada. There he was responsible for marketing support, product and customer support and product line requirements.

McKay earned degrees in math and computer science from the University of British Columbia.

•••

CONAN N. WILSON has been appointed manager of information services at Macklanburg Duncan Co. of Oklahoma City, Okla. He now directs all computer operations and systems development at the company.

Wilson worked as DP manager at Fred Jones Manufacturing Co. prior to joining Macklanburg.

•••

Samuel A. Malek

ROBERT J. FILEK recently joined First Chicago Data Corp. as regional manager of the company's DP center in Bloomington, Minn. He will now coordinate the firm's DP services in the Twin Cities area.

Before joining First Chicago Data, Filek was branch manager for the Minneapolis office of National CSS, Inc. He also worked in sales and marketing with Interactive Data Corp.

Course to Offer Data Base Brief

DELRAN, N.J. — A one-day management briefing session, "Accessing and Utilizing Public Data Bases" has been announced by Datapro Research Corp.

The course will be presented in Washington, D.C., on Oct. 19; Chicago, Nov. 2; New York, Nov. 9; and San Francisco, Dec. 14.

The briefing is intended for any user, planner, information systems manager or project leader who requires access to captured information other than what is available within his own operating environment.

The session will outline how public data bases can be accessed in support of a variety of activities such as research projects, comparisons and search review efforts. It also will explain how to keep abreast of the changing data environments in such data bases.

The registration fee is $360 for current Datapro subscribers and $395 for nonsubscribers. Additional information can be obtained from Datapro at 1805 Underwood Blvd., Delran, N.J. 08075.

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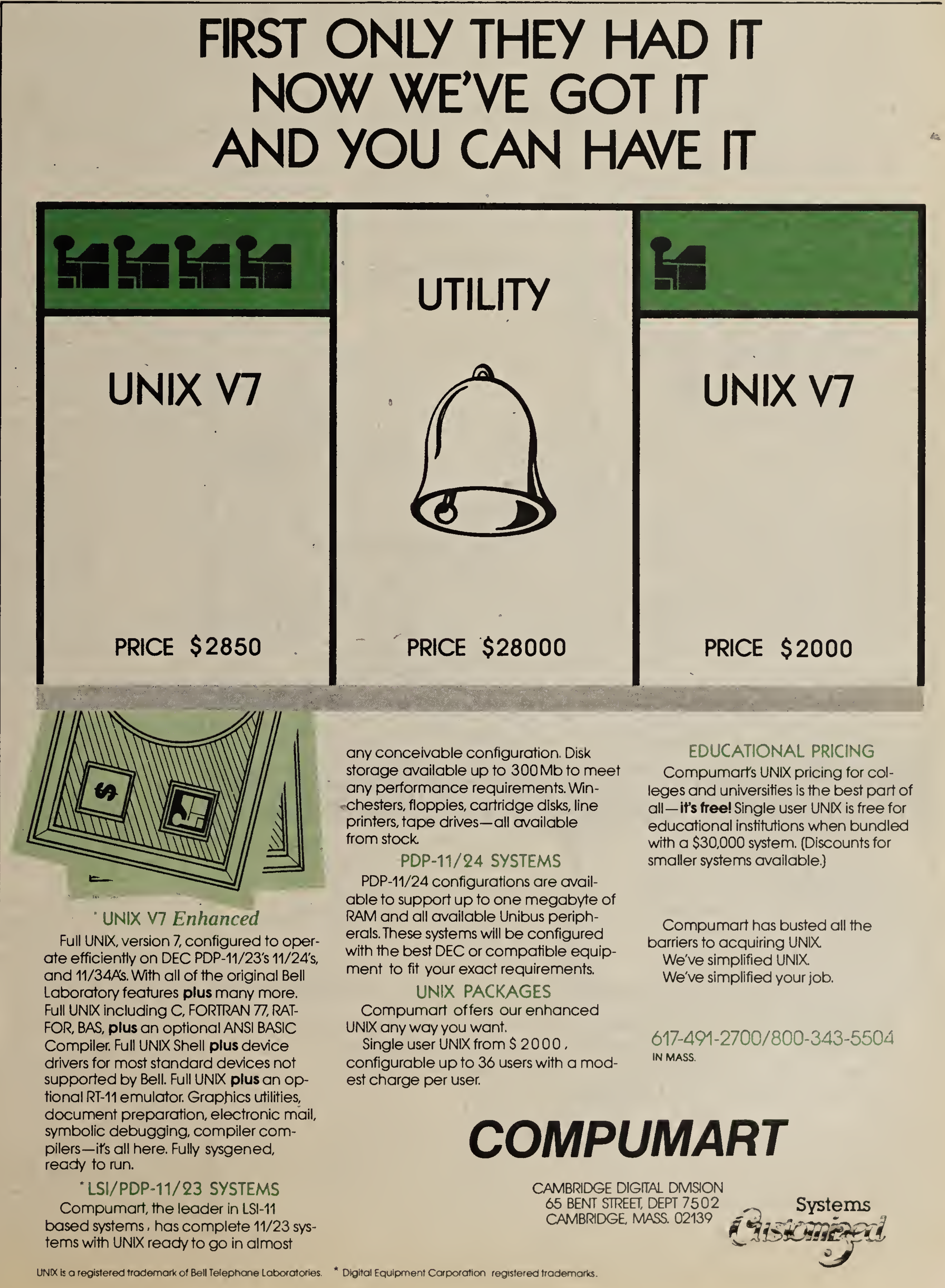

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Moffat: Management Unaware Of DP Security Vulnerabilities

By Lois Paul
CW Staff

ATLANTA — There is a general lack of awareness among senior management about DP security and contingency planning, despite the fact that a functioning DP department is the lifeline of many companies.

If management really was aware of the vulnerabilities of its company to various hazards, there would be a few sleepless nights, James Moffatt, a manager in the consulting services division of Coopers and Lybrand in Atlanta, told a small group of Management Science America, Inc.'s cash management customers who met here recently for the Interact user group conference.

Moffatt said his company has found that DP security in most firms is well below acceptable minimum limits. The objectives of a good security program, he explained, are to ensure the integrity of data, identify proprietary and privileged data, protect assets from natural and man-made disasters and ensure the organization's ability to survive hazards.

Security Plan

A security plan also should protect employees from unnecessary temptation and suspicion and protect management from charges of imprudence if a compromise occurs, he added.

Data security extends beyond protecting data and programs to the safeguarding of communication and terminal systems and documentation, Moffatt stressed.

More people now have access to the DP system. Security no longer involves only programmers and operators. Protection of documentation is important, Moffatt said, because "this is where a lot of the leaks are. People get access to documentation and this is a road map to the data and to the system."

Physical security, the area most people think of first, is a component of the plan and involves protecting the data center itself from disasters and emergencies.

Security should be as well planned as the average DP system, Moffatt said.

Instead, it is shunted aside because users are crying for new systems, not security procedures, and DP managers are not evaluated on their security performance.

Overlooked Area

Another area that is often overlooked is disaster planning, Moffatt said, noting that many DP managers view an informal agreement with another manager across town to use his system in case of an emergency as all of the planning that is necessary.

"On-line distributed processing has made disaster planning more necessary and more sophisticated," he said.

A contingency plan must match each organization's needs and must enable the company to resume processing of critical applications and restore total processing at some more distant time, he explained.

A six-step process for a contingency plan described by Moffatt included defining requirements, determining the critical resources, planning to ensure the availability of critical resources, clearly defining responsibility, developing a written procedure and monitoring the program.

As an example, inventory control and order processing for a large distributor may not have the manual backup of a payroll system and, therefore, would be deemed more critical, Moffat explained.

Companies must assign a value to the loss of processing for each application, prioritize these and then inform their users of these priorities in case of emergency, Moffatt said.

He suggested that a decision maker, possibly at the level of executive vice-president, should be assigned responsibility for overall execution of the plan.

A written plan is essential, he said, because "you can't in that chaotic state rely on memory." Periodic testing of parts of the plan are necessary to gain some feedback.

Among the alternatives companies can take with contingency planning is to revert back to manual processing or to arrange to share computer resources with another installation that has the same configuration.

The latter plan should be formalized and probably should extend for only about 24 to 48 hours.

Second Site

Moffatt said many companies decide to extend their computing power with a second site and this can be part of a contingency plan.

In some cases, this separate site is used almost solely as backup and can provide processing for other companies to make up some of the cost.

Another alternative is to establish a shell facility, a warehouse-type location that "has everything except the black box," in the way of floor space, wiring and air-conditioning.

Moffatt said most vendors are very good about installing computer equipment within 48 to 72 hours in case of emergency.

Group Rentals

Some commercial organizations offer shells that a number of companies can rent on a group basis. He noted that Sun Information Services in Philadelphia offers Sunguard, a full backup facility to which 120 of the Fortune 500 companies subscribe.

A group of companies in a city may band together to rent a shared backup site, but Moffatt said this often is not successful. If there is a major disaster in that city, the entire group would need the backup facility.

Generally, a combination of the various alternatives makes the most sense for a company, he said.

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Hitting Computer Centers

Farrell: 'Jesse James' Rides on in '80s

By Lois Paul
CW Staff

ATLANTA — "Everyone in this room could do computer fraud. . . Think of it as a way to beat inflation."

With this statement, Thomas Farrell, manager of Coopers & Lybrand's computer audit assistance group, began a tongue-in-cheek discussion of the dangers, or rather "opportunities," surrounding computer fraud.

He told about 25 of those attending Management Science America's Interact user group conference here recently, "You don't have to know Bean 1 about a computer to make a good living as a criminal."

Phony Invoices

As an example, he described the man who used a Radio Shack Corp. TRS-80 microcomputer worth about $1,500 and $700 worth of specially designed forms to send phony invoices to small-scale local governments — and to collect from them — for about two-and-one-half years.

His ploy was to use bogus input: "He played with the way people react to computer-generated data. If the computer says it, it's right." Farrell noted that the man even sent extremely polite second notices to his victims.

Another perpetrator in Pennsylvania used racing sneakers and a pair of $60 binoculars and waited in a telephone booth across from an automated teller machine (ATM). Noting the code the person punched in, he would take advantage of the fact that the system (at that time) did not "time out" for five minutes. He would run to the other machine, punch in the code and use it to make withdrawals.

"Somewhere out there is a computer Jesse James and, instead of hitting trains, he hits banks," Farrell said.

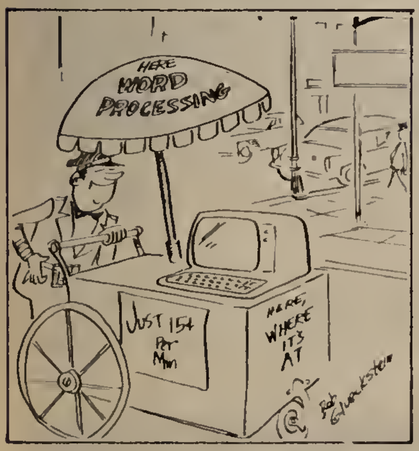
The problem is that the real-world environment is not in sync with the computer system design. A teller would know by sight that these were two different people making transactions; the ATM does not. "Computer crimes can take advantage of that," he noted.

Farrell cited the FBI's description of many of those who have committed computer crime (and have been caught, obviously) as young, very bright, possessed of tremendous egos and tending to "fiddle." An example was a young business undergraduate at the University of California at Los Angeles who got hold of Western Electric's technical manuals by rifling through the trash. He ran a business whereby he had a $52,000 PBX delivered to a manhole cover at 2 a.m.

This "computer criminal" used bogus input, but also

(Continued on Page 26)

CW Photo by L. Paul
Thomas Farrell



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Eliminate Guesswork

Executive: Best Cash Managers Have Least Cash

By **Lois Paul**
CW Staff

ATLANTA — One of the most critical problems of American business today is the maintenance of liquidity, David L. Shafer of Ernst and Whinney in Kansas City, Mo. told Management Science America, Inc.'s (MSA) Interact cash management user group, which met here recently.

"The best cash managers are the ones with the least cash," he said, noting that with the current economy and double-digit inflation, much of a company's ultimate survival is in the hands of its financial managers.

Cash flow is a vital tool for management, he said, adding that the No. 1 objective of a cash management system is eliminating as much of the guesswork as possible.

Cash Management Goal

The goal of cash management, Shafer explained, is to make sufficient cash available for efficient operation of the business and also to be able to take advantage of attractive business opportunities.

A cash management system should provide for forecasting, collecting, disbursing, transferring, borrowing and investing, he said, noting that MSA's cash management software packages mostly support the functions of collecting and disbursing.

Shafer stressed the need to differentiate between forecasting and planning. Forecasting is more appropriate over a shorter term basis, he said, but is not terribly viable over the longer term.

Planning over the longer term better reflects changes in direction within the company, he added.

Forecasting Packages

Shafer explained that there are a number of good forecasting packages available for companies, and banks themselves often offer these. He said MSA has a package that ties into its general ledger system.

These packages are available on time-sharing networks and on microcomputers, he continued.

He said that with regard to planning, his own firm has had the most success with modeling languages, such as Target, Easyplan, Visicalc and FCS. These are available on time-sharing, Shafer explained.

"You are not prepared for the 1980s if you are not developing a good cash plan."

The best possibility for most businesses, according to Shafer, is to obtain a plan for use on a microcomputer, thereby avoiding the time-sharing expense and providing an interactive capability.

His recommendations included optimizing cash flow and minimizing unknowns, particularly in control of disbursement decisions.

Farrell: Computer Fraud Easy

(Continued from Page 25)

had some specialized user knowledge and was a "computer tinkerer." The student was caught and later sued, Farrell said, adding that he settled the case for "60 days and $8,500" and now earns the same amount of money in his new business as a computer security consultant.

Many control weaknesses can be exploited, Farrell said, as in the case in which Leavenworth prisoners used the print shop there to produce phony W-2 forms. They used these to file bogus tax returns and received refund checks.

The flaw in the tax system was that most states do not match 990 forms, which indicate who earned money during the year, with W-2 forms. "After six or seven more years you may not be able to do this one any more," he added.

There is also the "salami technique," in which a person slices off little pieces and gets it back all at once. An example described was that of a programmer who inserted a routine with his girlfriend's name into the Cobol program he was responsible for and which calculated interest for savings accounts.

The routine would shave off some of the interest and move it to his girlfriend's account on a weekly basis, to a total of about $200.

He was caught and did serve three years in jail only because another part of the program "blew up" while he was on his honeymoon. Another programmer discovered the routine while checking the program, Farrell said.

"These schemes deal with using the system to generate cash flow," he said, adding that even more valuable to computer criminals is computer time.

"That is going to become a larger problem of organizations — people in-house stealing time," he said. DP managers need to determine that every penny of the machine they are using is their's and is not being siphoned off by other people.

Another problem is theft of data through which a company's reports are tapped, bid information is stolen or a mailing list is duplicated and peddled.

"Almost anybody can walk into a tape library and walk out with a tape under their arm. That is the nice thing about being a computer criminal. It is a trusted position," he said. "It is so damn easy and people are too complacent about it." The biggest problem is that people almost innately trust computers, even more than they trust people, Farrell said.

Expensive Call

He cautioned that calling in a team of auditors to detect a suspected fraud is expensive, much more so than prevention techniques up front.

DP managers must develop the attitude that "this box works for me," and must become educated about the types of controls they need to institute.

"A well-controlled system will be cheaper to run, not more expensive, because you don't have a million reruns and don't need to spend hundreds of hours tracking down exceptions," he explained.

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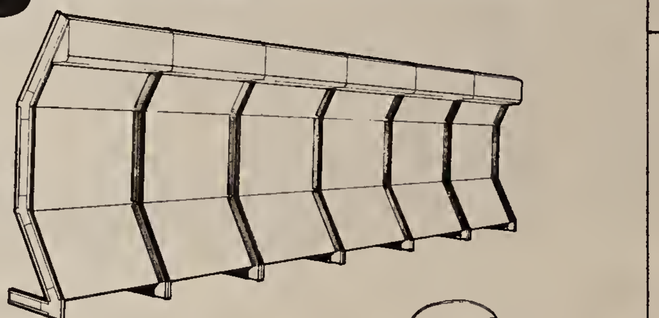

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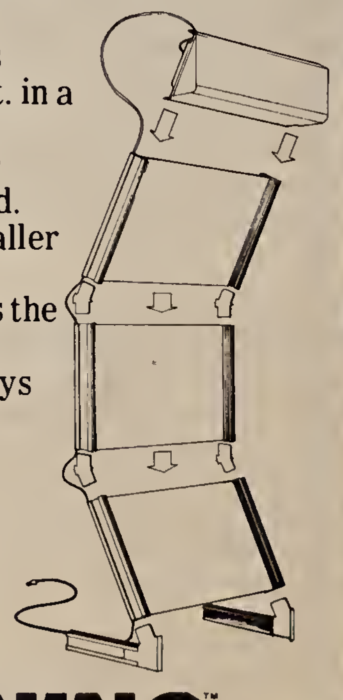

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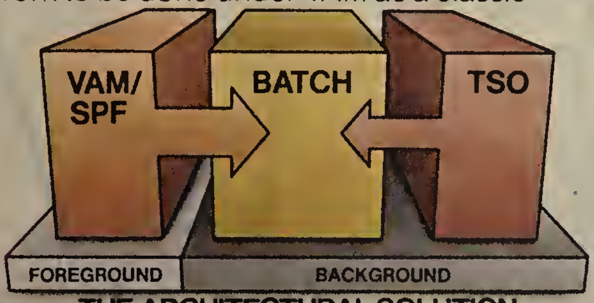

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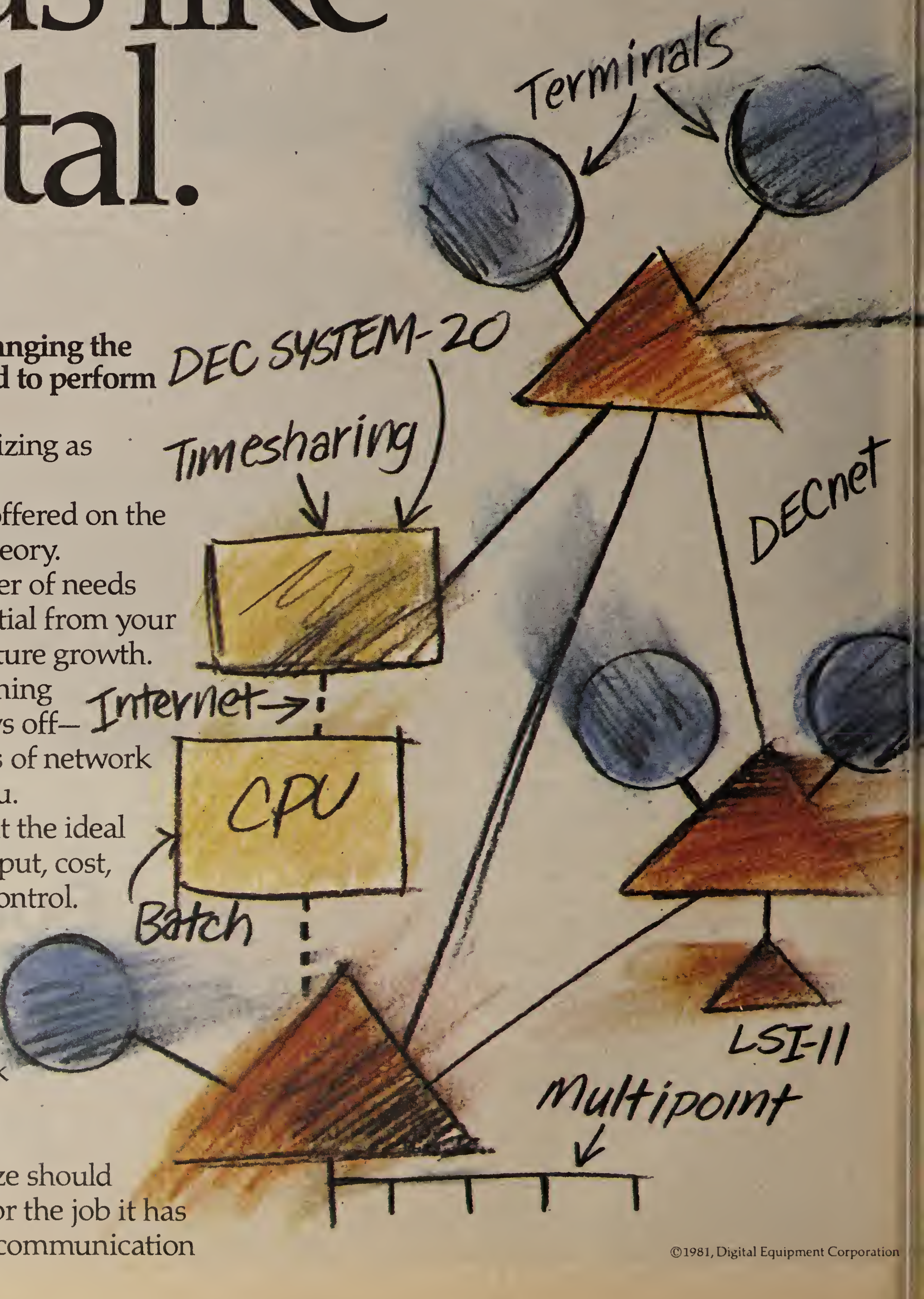

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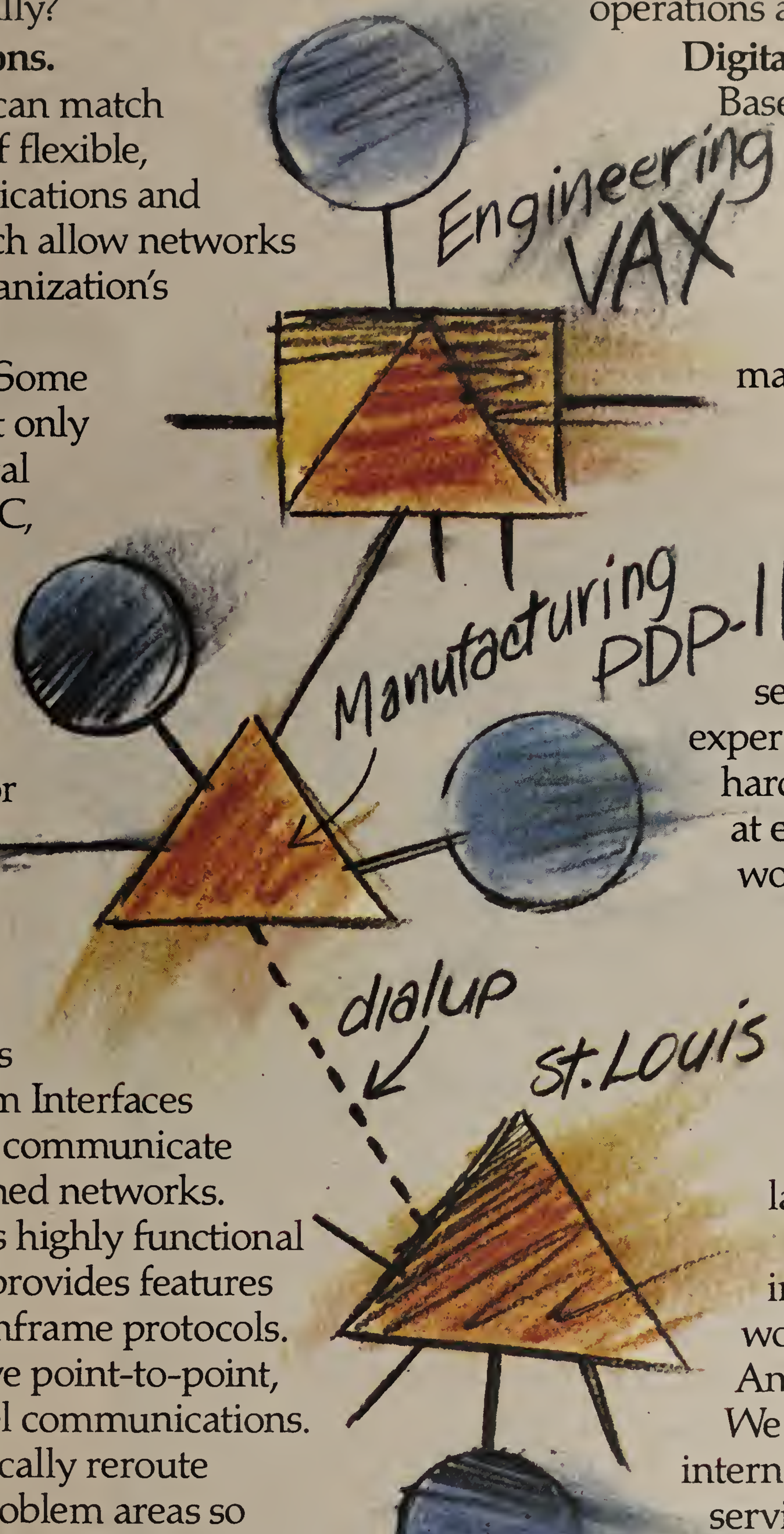

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Professor Sees Economic Upturn

CW Photo by L. Paul

Donald Ratajczak

By Lois Paul
CW Staff

ATLANTA — After a series of churning economic activities during the next few years, the economic system will break out of its pattern and become viable again after 1985, according to Dr. Donald Ratajczak, director of economic forecasting and professor of economics at Georgia State University.

Meanwhile, we will experience cycles of exuberance followed by cycles of depression, along with persistent high interest rates, he explained to Management Science America, Inc.'s (MSA) interact cash management systems users group, which met here recently.

Ratajczak described it as the necessity of "going through the rapids before you can get to the calm lake."

There is a high probability the next balanced budget will not arrive for the next half-dozen years, despite the Reagan administration's 1984 deadline, he said, pointing to factors such as a high consumption economy, enormous investment needs and a government that is tapping investment capital.

He cited as another factor the "baby boom," which now can be described more accurately as a "mid-life crisis boom." It was felt that with an aging population would come a higher skilled work force.

Instead, the 1970s brought a reversal of this trend, with a need for enormous training resources to prepare men and young people entering the work force in large numbers.

Some economists have said this was the No. 1 problem causing a decline in productivity in the last decade.

The energy problem has subsided significantly, with the realization that people can use less energy if the price influences are strong enough.

However, oil companies now have to drill 15,000- to 20,000-foot, rather than 3,000-foot, wells. Natural gas no longer is discovered by accident, but requires exploration. "The number of barrels per foot of pipe have dramatically fallen," he said, noting that more investment is needed to get the same return.

One of the economic conflict factors is the significant gap between the amount of housing stock available and that which will be needed, according to Ratajczak. Row houses and "ghetto density" housing, undesirable a few years ago, has evolved into acceptable "townhouses" and "nice cluster housing," he said.

The needs remain and, after significant reduction in interest rates, there will be a floor in the housing market, he added.

Deferable Consumption

Consumers are attempting to resolve economic problems by means of deferable consumption, he said, using the slump in the purchase of automobiles as an example. For a short period of time this is an appropriate resolution of the problem, he said, noting that car purchases have fallen below even the most pessimistic projections of automobile needs, he explained.

Basically, this is truly deferrable, not cancellable, consumption and consumers will buy cars again, he said.

This is an indication of how economic problems have been "solved" in an ad hoc fashion, Ratajczak said. If we are able to manage this period better than in the last couple of years, the churning activities may solve themselves somewhat sooner than 1985, he said.

His forecast for the third-quarter GNP was 5% positive growth. "The economy just doesn't want to die on us." An impetus for strength will be consumer activity, he predicted.

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Needed Accurate Information

GL Helps Heublein Uncork T/S Bottleneck

By Lois Paul
CW Staff

FARMINGTON, Conn. — Heublein, Inc. was able to eliminate a $150,000 per year computer time-sharing service when it installed an automated general ledger (GL) software package at its headquarters here and at the company's overseas subsidiaries.

The switch has saved Heublein more than $100,000 annually and has enabled it to do overseas financial analysis and business planning at a highly detailed level, according to Steven Fellingham, vice-president for finance and controller of the international group.

Heublein, a worldwide distributor of Smirnoff vodka and Kentucky Fried Chicken, needed accurate, timely information about its international dealings at its U.S. headquarters.

Different Systems

Two years ago, the company's international subsidiaries and headquarters operations were using different general ledger software systems that did not provide an efficient method for transferring detailed data to the central office.

General Electric Co.'s time-sharing network provided Heublein with efficient report writers, but basically only access to summary data. The service cost $150,000 each year, proved difficult to control and was easily abused, according to Fellingham.

"With every application, it got more and more expensive. The cost spiral would have been never ending," he said.

Therefore, he began searching for a new solution to the company's international information needs.

Package Search

Fellingham examined packages from Software International Corp., Management Science America, Inc. and McCormack & Dodge Corp. The latter's G/L Plus package was chosen, he said, because it "had modeling capabilities and report writers and required minimal technical knowledge to operate because of its one-file structure."

The package was installed initially in about nine days on the company's IBM 370/158 mainframe at its headquarters. All subsidiaries subsequently transmitted summary data for consolidation through G/L Plus using remote job entry stations, Fellingham said.

The subsidiaries with G/L Plus began sending a duplicate magnetic tape to Farmington each month, enabling home office managers to use the package's report writers to generate data on operating results in each subsidiary.

Results on a brand-by-brand, region-by-region or store-by-store basis could be examined, Fellingham explained.

It also was possible to construct a chart of accounts that is uniform worldwide down to the brand or entree item level. Below this level, each subsidiary could construct its own account codes for different package sizes or special promotion items, Fellingham said.

Mainframe Switch

When the company recently switched from its IBM mainframe to an IBM System/34, G/L Plus was installed and operational in a matter of days, Fellingham said.

"Everybody's in love with the system, particularly since it's been put on a System/34, where we have a dedicated computer. There is no turnaround problem," he added.

The System/34 is being leased for $3,000 a month as opposed to spending $150,000 per year for time-sharing and the company can run an unlimited number of applications on it at no additional cost, Fellingham explained.

"The G/L Plus package has worked very well. It has been exceptionally easy to train people on it," he said. There have been no staff changes as a result of the switch from time-sharing. Staff has been retrained on the software package.

He noted that the only problem has involved support for the package in the company's overseas operations.

ABA Directory Lists Law Applications

CHICAGO — The American Bar Association (ABA) has published a directory of software and services geared to the legal profession.

The title of the catalog-type publication is "Locate: A Directory for Purchasers of Law Office Computer Applications and Software."

The directory contains profiles of more than 200 vendors and reportedly helps users select computer applications for their needs and distinguish between in-house vendors and service bureaus.

The directory costs $18 for members of the ABA's Economics of Law Practice section and $28 for all others.

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Savin Selects Unis-100 For U.S. Copier Plant

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BINGHAMTON, N.Y. — Building copiers is not as easy as using them. When Savin Corp. decided to move its manufacturing facility from Japan to an industrial complex near here, the firm decided it needed an industrial computer system in a hurry.

The firm looked at NCR Corp.'s 8600 line, Burroughs Corp. B6800, IBM's 4341 and Sperry Univac's Unis 1100. The firm decided on the Univac system because it offered a hardware and software mix that best suited the applications, a spokesman said.

The Unis-1100 system is oriented toward production and inventory control. Savin also installed Univac's Mapper, a report processing system to handle prevalidation and data entry, the firm's management information systems Manager James N. Weniger said.

Labor Saver

In the first six months, more than 110 applications have been developed by users. If the firm tried to develop those applications in conventional computer languages, like Cobol, it would have taken "at least a five-man-year effort," Weniger said.

Labor reporting was operational two days after the application was requested. Routinely, the accounting department would have hired two people to develop the system manually. Or, without Mapper, it would have taken weeks to develop a conventional system, Weniger said.

In another example, a request for a material costing application on Thursday was filled the following week when information from Unis was "dumped" into Mapper. Otherwise, the job would have taken months, Weniger said.

"We can take any standard data format report from Unis, load it into a Mapper route and manipulate the data any way we want," Weniger stated. Standard cost files, he added, were developed this way from bill of materials being loaded into Mapper.

The Univac system was selected in competition with the hardware and software proposed by three other vendors. Savin started development in a building here before the plant, located a few miles away in Choconut Center, was built. Unis and Mapper were tailored to Savin's requirements on a Univac 1100/11.

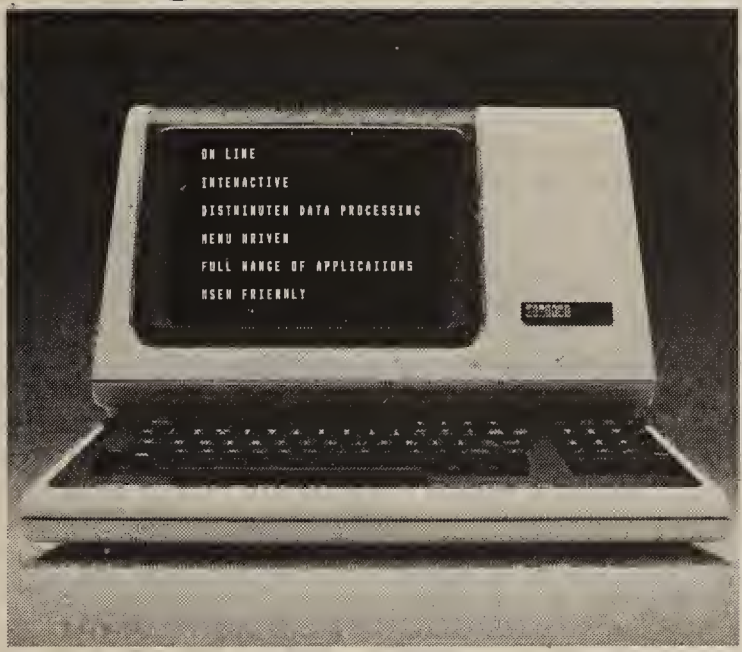
After the new plant opened, the Univac 1100/11 was replaced on May 1 by the more powerful 1100/60 system. This, in turn, will give way by the end of the year to the still larger 1100/62 system, which will process the actual jobs. For each upgrading, the hardware is not replaced; only the capacity is enlarged to handle the greater volume of data.

Mapper, Weniger noted, is particularly suited to small files, those with 1,500 to 2,000 records. A user can exceed this limit by splitting the application into multiple files. However, to avoid things getting out of hand, "you need a good Mapper coordinator to police" the situation, according to Weniger.

Savin's Mapper coordinator is Bert Lawrence, a systems analyst who trains users and helps them set up reports. The users, who include clerks, engineers and accounting personnel, have no programming backgrounds. Yet Lawrence is able to train them in 4½ hours over a three-day period to sign on and get reports. "After a month of hands-on experience, they become competent," he said.

However, users do have full control. The files are theirs. "They have the flexibility of generating any type of report based on the data set up without going back to data processing," Weniger said. "Information is available in any sequence at any time and they can search out elements they do not want," he added.

James N. Weniger, manager of information systems, scans a message at the Univac 100/60's console station.



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Special to CW

MOSCOW, Idaho — The catfish are jumpin' at the University of Idaho here since the school put a computer to work at raising them up proper.

The one-year project, headed by Prof. George W. Klontz of the university's fishery resources between 1978 and 1979, succeeded in producing thousands of catfish and carp of predictable size, weight and quality, which were ready at a specified date for eating or stocking in lakes and streams.

"We used an IBM 370/158 computer to generate a mathematical model of the end product — fish having certain characteristics," explained Klontz. "By controlling their growth rate, we had the fish reach the desired size within the specified time."

Within the year, the catfish were uniformly two pounds; the carp, five pounds.

The experiment, conducted near a geothermal water source at Twin Falls in the southern part of the state, utilized water cooled to 80°F, a temperature at which catfish thrive.

With the use of a computer model, the group first "grew" the fish within the 370/158 (since replaced by a more powerful 4341). The many variables that affect growth and quality were tested in the computer model in order to come up with the best results.

"The system works for almost any species," Klontz said."Using computer modeling, we've raised over 30 species."

Klontz, who has been "following fish for over 26 years" as a specialist in fish culture, said if anyone had told him five years ago that fish could be raised by computer, "I'd have said they were dreaming."

The practical application of the research is the predictability of the end result and what it implies for the marketplace or for replenishment of nature's resources, he said.

For example, suppose a supplier wanted 100,000 fish, uniform in size and weight, ready for market in exactly one year.

The computer model would list the conditions necessary to meet those specifications, including the quantity, quality and schedule of feed and precisely when to start hatching the eggs.

The supplier, meanwhile, could gear up a year ahead for distribution of the fish, instead of the 48 hours lead time he gets today.

An example of the model's accuracy is that at any given time during growth, researchers can consult the computer to determine the weight of the fish at that stage. Observations have borne out those weights, allowing 24 hours leeway.

The model also can be applied to existing fish farms to predict yield. Specialists enter data in the computer such as species, pond acreage, water chemistry and feed. According to Klontz, the system's predictions have proven accurate.

In any fish culture facility, he said, there are five major components; species, water, pond or tank, nutrition and management practices.

Each component consists of a number of factors, any one of which may limit the growth rate of the fish. A change in one factor may generate a change in others.

All told, there are 50 or more variables addressed by the computer model, but only 10 were used for the catfish project.

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'Wolfie' Tracks Firm's Worker's Compensation

SAN JOSE, Calif. — Wolfie, Granny and Lil' Red could be characters straight out of a children's novel. But they are not — they are the pet names given to three Hewlett-Packard Co. Series III processors at Employee Benefits Insurance Companies (EBI) here and they are the brains, eyes and ears of the firm's worker's compensation policy bookkeeping.

The on-line electronic triad maintains information on more than 200,000 policies and claims. Two-thirds of the system monitors the progress of claims management and can be utilized by EBI's member offices in Chicago, Los Angeles, San Diego, Portland, Ore., and Sacramento, Calif.

The final system portion, "Granny," is employed by EBI's computer experts as a partner in future program development.

The minicomputer-based system was installed and its software developed and functioning in about two months, a fraction of the time it would have taken to install a mainframe system, Dana Brown, EBI's vice-president of information service, observed.

It costs about $300,000 or approximately $8,000 per month with maintenance.

"Using this on-line computer system, members of outlying EBI offices can retrieve claim details or summary information necessary to analyze accident or injury data," Brown said. Members access the computers' records through the system's 100 CRT terminals.

Bane of System

The bane of any information gathering and retrieval system is getting the correct information linked up with the right person's name. In order to facilitate that chore, the system incorporates software that allows operators to recall policyholder information by typing a sound-similar account query into the computer. When an entry is made, the computers display all the clients whose names "sound like" the one typed in by the operator.

This sounding system cuts down on tedious research for a policy number and allows even novice operators to accurately research claims status and policy information, Brown noted.

Besides making sure that claims are answered promptly, the triple-processor system also acts as an accident prevention tool by generating loss analysis reports that identify problem areas.

The report generated by the computer submits a statistical analysis of these problem areas, identifying the characteristics, frequency and the time of day an accident occurs, Brown said.

The summarized findings are distributed to EBI loss control experts who take appropriate measures to decrease or eradicate the potential for work place mishaps, Brown explained.

The system is also capable of tracking vocational rehabilitation claims, which is particularly important in California, which concentrates on providing vocational rehabilitation for employees who are severely handicapped in job-related accidents, she said.

The First Begins Today

Videodisc Offers Three Courses

SANTA ANA, Calif. — Two three-day courses on "Data Communications" and "Systems Analysis" are being offered by Videodisc Learning Systems, Inc. in several cities this fall and winter. A five-day "Structured Maintenance Workshop" is also being offered.

The data communications course was designed for people who must work with data communications functions or interface with people who do, but do not have to learn the detailed criteria of this subject.

It will begin today in Los Angeles and will also be held in New York, Oct. 14-16; in San Francisco, Nov. 18-20; and in Washington D.C., Dec. 2-4. It costs $595.

The systems analysis course was designed to help analysts sharpen their communication skills. It teaches them to be more effective interviewers, writers and verbal communicators. It will be held in Chicago, Oct. 5-7 and in New York, Oct. 26-28. It costs $545.

The structured maintenance workshop is for the programmer and analyst working in the area of software enhancement. It will be held in New York, Nov. 16-20 and in Los Angeles, Dec. 7-11. It costs $795. Videodisc is located at 10522 Ridgeway Drive, Santa Ana, Calif. 92705.

Technology Goes to Court

WILLIAMSBURG, Va. — A two-day seminar on technology in the court system will be presented by the State Judicial Information Systems Project of the National Center for State Courts Nov. 12-13 in Seattle, Wash.

Word processing vendors will be on hand to demonstrate how systems can be used for text editing and case processing and court officials will make presentations of how technology can improve the quality of court services in light of budget cutbacks, according to a spokesman.

The seminar is scheduled for the Seattle Hilton and registration is open until Oct. 20. The seminar costs $50 and includes all presentations, a course notebook and lunches, a spokesman explained. The center is located at 300 Newport Ave., Williamsburg, Va. 23185.

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Network Links 19 Agencies in Puerto Rico

Special to CW

PUERTO RICO — Government agencies sharing resources to save money and improve efficiency may seem to be nothing more than a pipe dream.

But that is exactly what is happening here with 19 different agencies sharing a Honeywell, Inc. Multics computer system.

Puerto Rico's Highway Authority was the first organization to jump on the Multics bandwagon.

It originally acquired the system in 1977 and is still the heaviest user, running "24 hours a day, seven days a week," according to Hector Santiago-Chinea, director of the system and information center.

Specialized Areas

Besides processing financial management and engineering applications, the Highway Authority utilizes the system in more specialized areas including traffic volume analysis, roadway design, structural engineering and traffic noise predictions.

Highway toll collection throughout Puerto Rico is audited on a daily basis and eliminates paperwork while keeping track of traffic volume and related accounting, he said.

"Multics gives us every capability we need — batch, time-sharing, transaction processing and remote job entry . . . in a highly secure system," Luis Landrau, the Highway Authority's executive director, maintained.

"We're also very pleased that much of our data processing can be done by employees who have had little computer experience."

The Transportation and Public Works Department uses the dual-processor system for both its accounting functions and to handle driver and vehicle registration, Santiago-Chinea continued. Via an interactive Vehicle and Driver Information System (Vadis), the organization processes more than 22,000 daily transactions for the island's approximately 2.2 million drivers and over a million vehicles.

Multics has also been pressed into service by the police department, Landrau said. Linked to the computer via 32 terminals, the officers can access Vadis at any time for information helpful to control crime.

These three agencies are only a segment of the Multics user network, Santiago noted. The computer system is a large one with 4,200M bytes of storage available.

"We are able to share its resources among such agencies as the Energy Authority, the Army Corps of Engineers, the FBI, the Department of Labor and the Planning Board, to name just a few," he said.

This cooperation allowed the Highway Authority to realize up to 40% in DP savings during the first three years of operation, he estimated.

And that's just the beginning. The island's Planning Board is now formulating plans for a centralized human resources data bank.

Referred to as Infosistema, these employment statistics will hopefully enable government agencies and private firms to make better use of Puerto Rico's workers.

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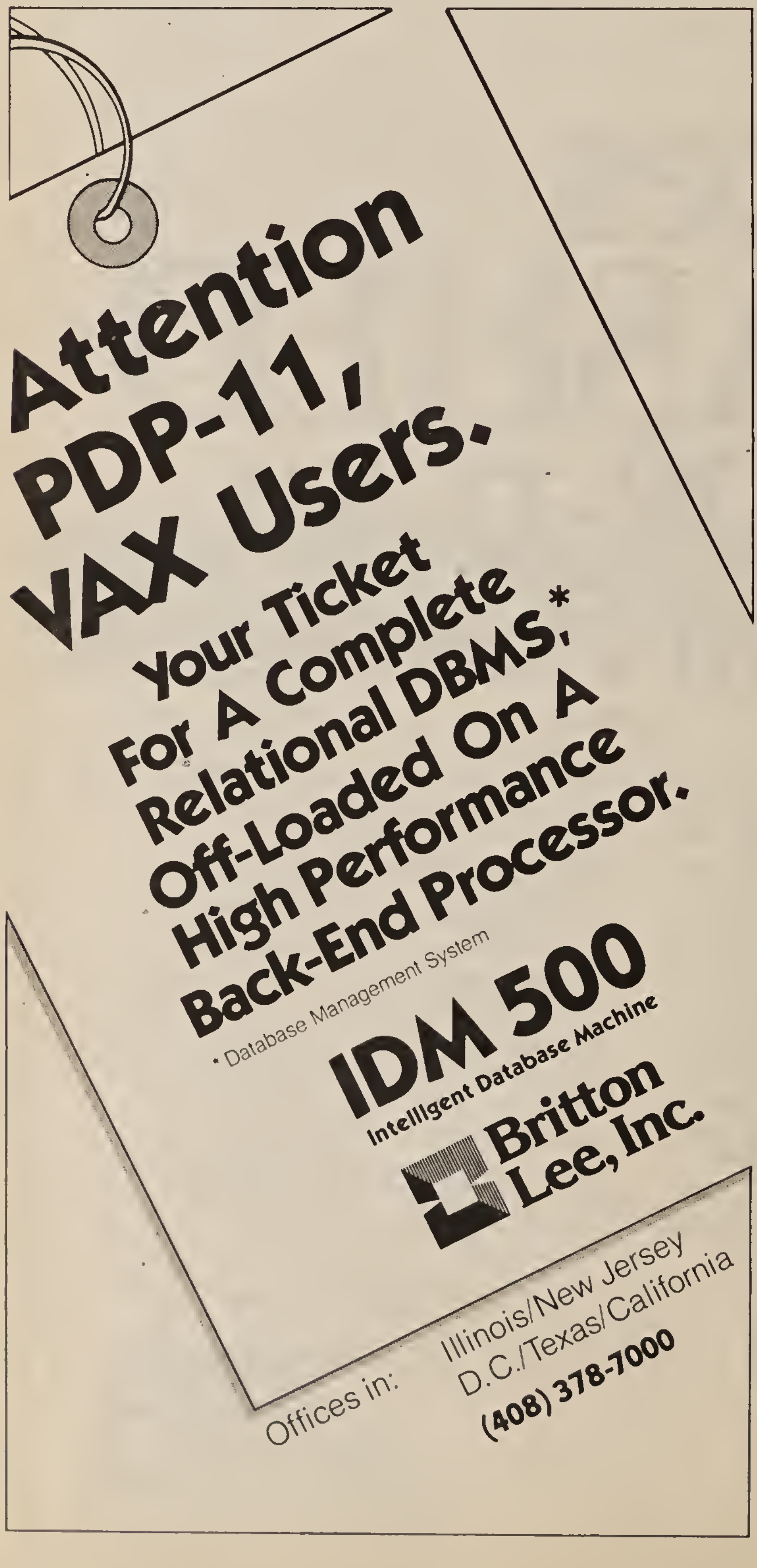

CLA Meeting Takes Aim At Software Secrets Theft

SPRINGFIELD, Va. — Software copyright, patent and trade secret protection will be the focus of the Computer Law Association, Inc.'s (CLA) conference here Oct. 15-16.

Speakers for the program, entitled "Computer Software Protection: A Pragmatic Approach," will explain how to tailor the legal means to fit the needs of software developers.

Protection issues involving microcircuit chips will be highlighted and international computer software protection will also be explored, a spokesman said.

The last half of the second day will be devoted to a panel discussion of issues and trends in software protection.

Admission is $90 for CLA members and $130 for nonmembers. Additional information is available from CLA at 6106 Lorcom Court, Springfield, Va. 22152.

Afcom Meeting On Operations Set Nov. 2-4

ANAHEIM, Calif. — The Association For Computer Operations Managers (Afcom) will hold a three-day conference here called "Focus on Operations" at the Inn At The Park Hotel Nov. 2-4.

Topics to be covered at the conference include hardware maintenance, automated job scheduling, managing the computer operation, local area networks, recruiting and retention and education in computers, among others, a spokesman said.

Registration prior to Sept. 25 is $465 for Afcom members and $525 for nonmembers.

After Sept. 25 the fee for the conference will be $525 for members and $580 for nonmembers, acccording to the spokesman.

Further information is available from Data Center Management Services, 935 S. Gilbert St., Anaheim, Calif. 92804.

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Plumbing Firm Automates To Keep Records Flowing

Special to CW

Because computer applications for the plumbing industry have historically not fared well, Bond Plumbing Supply Co. was skeptical about automating its operation.

"Computers historically haven't fared as well in our industry as they have in others. The failures have outnumbered the successes, but we've proven that properly programmed small business computer systems can succeed in this industry. Our company's come a long way," Tracy Bond, executive vice-president, remarked.

Founded by O.P. and Geneva Bond nearly 35 years ago with a capital of just $1,875, Bond Plumbing Supply has grown to become one of Florida's largest wholesale plumbing supply companies through innovative marketing and a full line of brand name, quality products.

Billing Disaster

With a staff of more than 100 employees and annual sales of $25 million, the company has grown significantly over the years. However, until last year the office and recordkeeping systems had been done manually.

"Our billing system, for example, had become a disaster. We were billing accounts payable on the seventh or eighth of the month when payments were due on the tenth," Bond recalled.

Bond salesmen were also inconsistent with price quotes. Dozens of manufacturer's catalogs, customer discount ratings and markups are often incorporated in a single quote.

These price sources were becoming so unwieldy that customers could call the parts department, obtain a quote and then call again and obtain a different quote from the salesman on the same item, a company spokesman said. It was disorganized because everyone was dealing with different information. Now, with a computerized product file of 18,000 items, only one price is quoted.

Bond chose Microdata Corp.'s Reality system with a 48K-byte memory, a 50M-byte disk drive, seven terminals, one slave printer and a 300 line/min printer.

With six offices and showrooms throughout Florida, credit and collections had become one of Bond's primary concerns. With manual invoicing and recordkeeping it once took several days for purchases to be applied toward customer accounts.

By that time, some of Bond's corporate customers were thousands of dollars over their established limit. It was too late at that point to do anything about it other than wait to be paid. There was no method of enforcement.

Total Computerization

Now, with a Microdata Reality system, Bond has totally computerized the credit function.

Anyone at any of the offices can enter a purchase into the system. Purchases exceeding the credit limit are either rejected or reviewed at management discretion. If customers go over their limit now it is because Bond has reviewed the circumstances and approved it.

The Reality system also provides a general sense of coordination among the offices, which gave the Bond family a greater feeling of control over its corporate future.

It often took three months or more just to calculate certain sales data, and even then the reports only showed figures. "Now, the reports we gather tell store managers and their sales staff who's selling what, which items are moving in a particular showroom and how trends are affecting overall performance," Bond said.

Tom Dulin, president of H.T. Dulin and Associates, Inc., a Florida-based computer systems design and development company, was the software supplier instrumental in placing the Microdata unit in Bond's offices.

Bond talked with Dulin and learned that he had been successful using Microdata equipment within the plumbing industry.

Increased efficiency has saved thousands of hours. It is easier to train personnel because of the English data retrieval language and the system makes all processes function more smoothly than ever before. Instead of people with pencils and paper struggling to keep pace, Bond now has people sitting in front of terminals setting the pace.

Bond Plumbing's sales for the first half of 1980 tripled over the same period one year ago and Bond attributes a major chunk of the company's success to the increased efficiency that the Reality system has made possible.

Prime Users Plan Meeting

WOOD DALE, Ill. — The Central Prime Users Group will hold its fourth annual meeting Nov. 9-10 in Rolling Meadows, Ill.

The meeting, for all users of Prime Computer Corp. systems, will include discussions and sessions on topics such as Fortran 77, Pascal, Cobol/DBMS, networking, system security and throughput.

The fee is $50, which includes all meals. More information is available from Central Prime Users Group, 130 N. Ash, Wood Dale, Ill. 60191.

Newsletter Set On Medical Micros

YUCCA VALLEY, Calif. — A newsletter dealing with microcomputer uses within the medical profession is available from Charles Mann & Associates' Management Consulting Division.

"Micro Medical Newsletter" was designed to provide advice on the use and selection of applications for use on microcomputers in the medical office. The current issue gives a detailed review of important accounting and insurance claim management systems

The monthly newsletter costs $25 per year, Charles Mann said from 7594 San Remo Trail, Yucca Valley, Calif. 92284.

Unix Centers Established

BATAVIA, Ill. — A comprehensive educational center and Remote Technical Assistance Center have been established to provide support for Unix language users. Set up by Uniq Computer Corp., the centers are focusing on Unix distribution, standardization, support network and education, a spokesman said.

The courses offered by the Uniq Educational Center are "Introduction to Unix," "C Language," "Unix System Administrators Course" and "Text Formatting for Clerical Personnel," according to Uniq.

The five-day, in-depth courses include lecture, lab session and a hands-on environment.

The registration fee is $600 and course materials cost another $50. Further information on the Uniq centers is available from the vendor at 28 S. Water St., Batavia, Ill. 60510.

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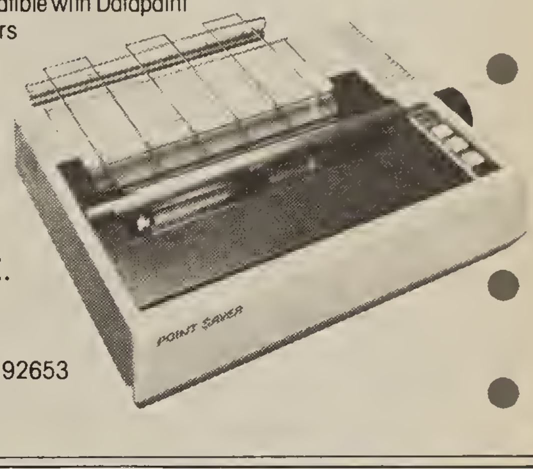

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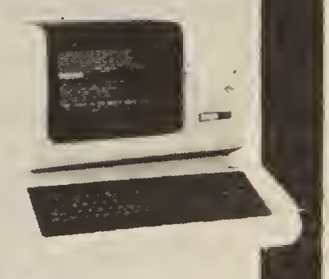

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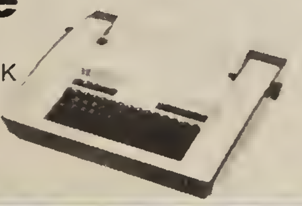

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TI DS990 Model 4	135.2 Sec **	4.3 Sec **
Hewlett-Packard 250	***	***
DEC Datasystem 355	84.1 Sec	16.1 Sec
Microdata 4000	239.7 Sec	3.4 Sec
Alpha Micro AM-100T	45.2 Sec	5.7 Sec
Data General CS/50	112.4 Sec	9.8 Sec

* Programs could not be run properly due to a loss of characters in the order-entry processing.

** For programs run in Cobol; the respective times for Pascal are 68.1 sec. and 3.9 sec.

*** The 8-terminal test could not be run, as a maximum of 5 terminals can be connected. With 4 terminals, times were 47.6 seconds for the CPU test and 2.3 seconds for the Order Entry test.

Not about to win the speed contest derby, the Data General Corp. CS/50's overall performance was nonetheless rated as above average or acceptable by most users.

Software and operating system compatibility combined with the ease of hardware upgrades enable the user to start with a small system and expand to a large capacity machine with a minimum of effort. The software is fully transportable across the entire Commercial System line, from the Micronova-based CS/10 to the Eclipse-based CS/70.

The CS/50 is the eighth system in the $25,000 to $50,000 range the Association of Computer Users (ACU) has reported on for *Computerworld*. ACU's independent consultants used for their tests a DG CS/50 Model C5 consisting of a Nova processor with 256K bytes of central memory, a 20M-byte hard-disk cartridge unit (10 fixed/10 removable), a Dasher D2 console terminal and a Dasher LP2 line printer. The system was configured with the CS operating system and a Cobol language compiler.

Total price of the system was $44,185. Additional terminals are available at prices ranging from $2,890 for the D3, $2,650 for the D2, to $1,950 for the D200. Beyond four terminals (plus the system console), an additional terminal connector unit ($1,400) is required.

Terminal Slowdown

As can be seen in the Scorebox, the CS/50's times were among the slowest of the systems thus far tested. The test programs were written in DG's version of Cobol. One outcome of the tests was a noticeable slowdown in system performance as terminals were added to the system. For example, with eight terminals attached, the order entry test results were approximately 50% slower than times obtained with only two terminals.

The degradation in the CPU-intensive test was even more pronounced. The runtime almost doubled when going from two to eight terminals attached. Nonetheless — and this is an important point — the average terminal response time with eight terminals would be considered adequate by most users.

DG is very much oriented toward the program developer, particularly the OEM who develops applications software, combines the software with the system and markets the entire turnkey package to the end user. Data General provides maintenance contracts for hardware and, although self-maintenance and third-party contracts are also possibilities, the DG hardware maintenance contracts should be considered. The system documentation, including the program development features and Cobol, is provided by DG.

This is the 37th in a series of articles giving the highlights of benchmark tests conducted on popular small computer systems. The full reports were originally published by the Association of Computer Users, a 4,000-member nonprofit organization.

Software documentation and training on system use is the responsibility of the OEM and should be included in the overall application system price. The OEM may also suggest that the user purchase or lease a Dasher D4 terminal for remote diagnostic and maintenance service. Although the additional expense may not appear worthwhile, such a service would be well worth the cost, particularly during the first few months of operating a new system.

Operating System

DG's operating system consists of the traditional line-oriented system commands, an editor, a compiler and an execution phase for program development. Unique, however, are the three modes of operation: utility, application and concurrent.

In the utility mode, only the master console is active and is used for data base management utilities, the compiler and communications control. In the applications mode, the runtime system is active and all terminals can execute Cobol programs as well as create new programs within the editors. The master console manages the runtime resources.

In the concurrent mode, one terminal is designated the concurrent terminal and, acting as a batch processor, performs in a utility mode. While other terminals can create and execute Cobol programs, only the concurrent terminal can compile programs and perform other utility functions. This "three-mode" operation may occasionally restrict the user as to what can be accomplished at a given point in time.

DG's version of Cobol includes several nice features such as structured programming statements like "IF . . . THEN . . . ELSE" and "PERFORM . . . UNTIL." In addition, a screen section in Cobol's data division allows an entire screen to be referenced. The screen editor enables a programmer to paint an entire screen, including prompts and input/output fields, on the terminal. The editor then generates Cobol code (which can be included in the application programs) for the screen.

Proxi, an interactive "program writer," allows the programmer to define data structures and procedures, primarily file maintenance activities and report formats and then generates core code modules that can be combined into complete programs.

These features are very useful, both for OEMs and for end users that plan to write in-house applications. Because accurate code can be generated faster, program development costs should be relatively low.

The Cobol compiler produces a semicompiled or pseudocode, which is later executed by the run time system. This feature provides the compatibility of programs across the entire line of machines since all compilers produce the same "pseudocode." Only the runtime systems vary from machine to machine.

A standard package of file management utilities is available for the CS/50. These include the Copy and Sort/Merge utilities, a file structure reorganization utility (Reorg) and a file compaction routine (Collapse) to physically eliminate deleted files. Three other utilities are provided for application design: Filestats to help predict optimum file organization, Inquire for creating test data files and Analyze for monitoring system activity.

Of the seven users contacted, reaction to hardware, software and system performance was mixed. The most negative hardware comments were directed toward the Dasher D200 terminal ("the keys keep popping off") and the LP2 line printer ("too slow"). Although CS/50 hardware reliability was not the same for all users, most felt that problems were minor or typical and that the hardware service received from DG was good.

Hillel Segal is president of the Association of Computer Users, a nonprofit association with members in the U.S., Canada and several other foreign countries. A package of information about the Association of Computer Users is available from the group at P.O. Box 9003, Boulder, Colo. 80301.

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Call for Papers

1982 NATIONAL EDUCATIONAL COMPUTING CONFERENCE (Necc-82), Kansas City, Mo., June 28-30, 1982.

Authors are invited to submit papers describing actual experiences with computer use in the classrooms or the consequences of such use on the educational process in general. Papers should report concrete results or be surveys or tutorials that include a synthesis and thorough evaluation. Papers reporting negative results are also encouraged, especially when the results could have a profound impact on the way educational computing should be viewed.

Specifications for paper submittal may be obtained from Gerald L. Engel, Computer Science Department, Christopher Newport College, 50 Shoe Lane, Newport News, Va. 23606.

20TH ANNUAL CONVENTION OF THE ASSOCIATION FOR EDUCATIONAL DATA SYSTEMS (Aeds), Orlando, Fla., May 10-14, 1982.

Papers are being sought on computer uses in administration, instruction, research, computer literacy, computer science, media services, hardware innovations, software development, guidance counseling, student management and business education.

Authors are invited to send a letter of intent to David Brittain, Program Chairman, Aeds '82 , Florida Department of Education, 109 Knott Building, Tallahassee, Fla. 32301.

SUMMER COMPUTER SIMULATION CONFERENCE, Denver, Colo., July 19-21, 1982.

The conference sponsors, the Instrument Society of America and the Society of Computer Simulation, are seeking papers on a wide range of topics, including: simulation methodology, digital and hybrid systems, graphics and display, languages and software, credibility and validation, chemistry and physics, energy and power, aeronautics and astronautics, transportation and logistics and numerous other simulation application areas.

A 500-word abstract or, preferably, a complete draft of the paper should be submitted by Nov. 15 to Lawrence Sashkin, program director, The Aerospace Corp., P.O. Box 92957, Los Angeles, Calif. 90009. Notification of acceptance will occur by Jan. 15 and completed manuscipts will be due by March 15.

PHOENIX CONFERENCE ON COMPUTERS AND COMMUNICATIONS, Phoenix, Ariz., May 9-12, 1982.

The first Phoenix Conference on Computers and Comunications is being planned and sponsored by representatives from the extensive Phoenix electronics industry, Arizona State University and various computer and communications societies, including the Phoenix chapter of the Institute of Electrical and Electronics Engineers (IEEE). Topics appropriate for paper submission include new devices and their impact on computers and communications systems; computer-aided process, design and manufacturing; communicating with and between computers; and software.

Authors are asked to submit abstracts (300 words maximum) no later than Oct. 15, which should include author's name, address and phone. These should be sent to E. David Metz, Motorola, Inc., MD B136, P.O. Box 2953, Phoenix, Ariz. 85062. Completed papers are due Nov. 15 and notification of acceptance will be Jan. 15.

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS' (IEEE) 9TH

'Break? What Break? This Is Counted Against Our Vacation Time.'

ANNUAL INTERNATIONAL SYMPOSIUM ON COMPUTER ARCHITECTURE, Austin, Texas, April 26-29, 1982.

Papers are being solicited on any aspect of computer architecture, including parallel architectures, high-level language machines, data base architectures and optical computing and interfacing.

Four copies of the manuscript (not to exceed 20 double-spaced pages) are due in for consideration by Nov. 1. These should be addressed to Miroslaw Malek, Department of Electrical Engineering, University of Texas, P.O. Box 7728, Austin, Texas 78712. Authors will be notified of acceptance by Feb. 1.

FIFTH ANNUAL SMALL COLLEGE COMPUTING SYMPOSIUM, Fargo, N.D., April 16-17, 1982.

Authors of papers are invited to write about their experiences with computers that would be relevant in a small college environment. Areas of interest include: using computers as a teaching aid, microcomputers, graphics, trends for the future, curriculum and various other academic areas.

One-page abstracts are due by Dec. 1 to Sandy Sprafka, North Dakota State University Computer Center, Fargo, N.D. 58105. Authors will be mailed notifications of acceptance Feb. 1, 1982.

XEROX 9700 NATIONAL USERS GROUP MEETING, San Diego, Calif., Nov. 15-18.

This meeting is a forum for the exchange of information among users of the Xerox 9700 Electronic Printing System and the Xerox Corp. Users are encouraged to present papers on such special interest areas as graphics, text processing, word processing, software, supplies and fonts. Both 9700 users and outside consultants are asked to present application information on check processing, forms, invoices, direct mail, bar codes, financial graphics and demand publishing. Papers should be sent to Joel Cartun, president of Comvestrix Corp., at 1501 Broadway, New York, N.Y. 10036.

11TH AMERICAN SOCIETY FOR INFORMATION SCIENCE (Asis) MID-YEAR MEETING, University of Tennessee, Knoxville, Tenn., June 13-16, 1982.

"Information: The Critical Difference" is the theme for this conference. Papers are being sought that address these questions: Does information make a difference in our decision making? What is the quality of the information we use?

Detailed abstracts should be sent by Dec. 1 to Ann Prentice at the Graduate School of Library and Information Science, University of Tennessee, 804 Volunteer Blvd., Knoxville, Tenn., 37916. For those abstracts accepted, full papers will be due on Jan. 30. Authors are reminded to include full name, address, organizational affiliation and phone numbers with abstract.

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Calendar

Oct. 19-21, Houston — **Mainstream-EKS/VSP Cray Vectorization Workshop.** Contact: Boeing Computer Services Co., Suite 1040, 2900 N. Loop W., Houston, Texas 77092.

Oct. 19-23, Minneapolis — **Advanced DMS II.** Contact: Woody Boyd, Manager of Education and Technical Support, Lawson Associates, Suite 390, 2021 E. Hennepin Ave., Minneapolis, Minn. 55413.

Oct. 19-23, Washington, D.C. — **IMS/VS Data Base Design.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

Oct. 19-23, Kansas City — **Structured Systems Design.** Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607.

Oct. 19-23, Arlington, Va.— **Three-In-One Computer Crime Seminar.** Contact: Three-In-One, Honeywell Information Systems, Inc., P.O. Box 6000, M.S. T99-4, Phoenix, Ariz. 85005.

Oct. 19-23, Washington, D.C. — **Personnel Productivity in Data Processing.** Contact: Keston Associates, 11317 Old Club Road, Rockville, Md. 20852.

Oct. 19-23, Washington, D.C. — **Remote Sensing for Global Resource Applications: Principles and Techniques.** Contact: Continuing Engineering, George Washington University, Washington, D.C. 20052.

Oct. 19-23, Chicago — **Structured Design Workshop.** Contact: Anthony Formica, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 19-23, Dallas — **Structured Design & Programming Workshop.** Contact: Anthony Formica, Yourdon, Inc., 1133 Ave. of the Americas, New York, N.Y. 109036.

Oct. 19-23, Los Angeles — **IMS/VS Data Base Programming.** Contact: Boeing Computer Services Co., Suite 300, 5757 Century Blvd., Los Angeles, Calif. 90045.

Oct. 19-23, San Francisco — **IMS/VS Teleprocessing Programming with MFS.** Contact: Boeing Computer Services Co., Suite 2001, 425 California St., San Francisco, Calif. 94104.

Oct. 19-23, Wellesley, Mass. — **CICS Command-Level Programming.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Oct. 19-23, Philadelphia — **Data Analysis/Data Base Design.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Oct. 19-23, Raleigh, N.C. — **Systems Analysis Workshop.** Contact: Priscilla Goudreault, Q.E.D. Information Sciences, Inc., P.O. Box 181, Q.E.D. Plaza, Wellesley, Mass. 02181.

Oct. 20, Philadelphia — **Data Base Seminar for Managers.** Contact: Rosalie Cope, Cullinane Database Systems, Inc., 400 Blue Hill Drive, Westwood, Mass. 02090. Also being held Oct. 22 in New York and Oct. 27 in Phoenix.

Oct. 20, Philadelphia — **Customer Information Systems for Bankers.** Contact: Rosalie Cope, Cullinane Database Systems, Inc., 400 Blue Hill Drive, Westwood, Mass. 02090. Also being held Oct. 27 in Baltimore.

Oct. 20, San Francisco — **The Stat Mux in Effective Network Design.** Contact: Bob Blama, Halcyon, 1 Halcyon Plaza, 21212 Zanker Road, San Jose, Calif. 95131. Also being held Oct. 22 in Los Angeles.

Oct. 20-21, Salt Lake City, Utah — **User Documentation: A Fundamental Course for Data Processors and Managers.** Contact: The American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held Oct. 22-23 in San Francisco and Oct. 26-27 in Baltimore.

Oct. 20-21, Boston — **The Writing System.** Contact: American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison, N.J. 07940. Also being held Oct. 22-23 in New York and Oct. 29-30 in Cherry Hill, N.J.

Oct. 20-22, Houston — **Computerized Office Equipment Expo/Southwest '81.** Contact: Janet Schafer, Cahners Exposition Group, 22 W. Adams St., Chicago, Ill. 60606.

Oct. 20-22, Palo Alto, Calif. — **Government-Industury Data Exchange Program Annual Workshop.** Contact: Officer-In-Charge, Gidep Operations Center, Corona, Calif.

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Oct. 20-22, Dallas — **Information Management in the '80s.** Contact: Southern Methodist University, Department of Computer Science and Engineering, P.O. Box 2700, Dallas, Texas 75275.

Oct. 20-22, Washington, D.C. — **Federal Software Procurement Workshop.** Contact: National Institute for Management Research, Department O-PR, NIMR Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Oct. 20-23, Atlanta — **Structured Requirements Definition.** Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. 8th, Topeka, Kan. 66607. Also being held Oct. 27-30 in Denver.

Oct. 20-23, Houston — **Ada.** Contact: LeAnne Grillo, Intermetrics, Inc., 733 Concord Ave., Cambridge, Mass. 02138. Also being held Oct. 27-30 in Los Angeles.

Oct. 20-23, Washington, D.C. — **Computer Graphics Systems: Design and Applications.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Oct. 21-22, Virginia Beach, Va. — **Federal ADP Expo '81.** Contact: Federal ADP Council, P.O. Box 9582, Norfolk, Va. 23505.

Oct. 21-22, Chicago — **Technical Management Workshop.** Contact: National Association of Bank Servicers, Suite 1325, 50 W. Broad St., Columbus, Ohio 43215.

Oct. 21-23, St. Louis — **ASTM Committee E-31 on Computer Systems.** Contact: J.J. Rothrock, American Society for Testing and Materials, 1916 Race St., Philadelphia 19103.

Oct. 21-23, New York — **Computers in Manufacturing Workshop.** Contact: National Institute for Management Research, Department V-PR, NIMR Seminars, P.O. Box 3727, Santa Monica, Calif. 90403.

Oct. 21-23, Houston — **Electronic Funds Transfer Interchange Conference.** Contact: EFT Association, Suite 800, 1029 Vermont Ave. N.W., Washington, D.C. 20005.

Oct. 21-23, Stamford, Conn. — **Keane's Productivity Management Seminar.** Contact: Raymond Smith, Keane, Inc., 210 Commercial St., Boston, Mass. 02109.

Oct. 21-23, Phoenix — **Forum: Leading-Edge Users, Consultants and Analysts.** Contact: Enterprise Information Systems, Inc., P.O. Box 1154, Greenwich, Conn. 06830.

Oct. 21-24, Singapore — **Second International Computer Technology Exhibition.** Contact: Aideen Barrett, Industrial and Trade Fairs International Ltd., Radcliffe House, Blenheim Ct., Solihull, West Midlands B91 2 BG. England.

Oct. 22, Washington, D.C. — **The Data Administration Function in Information Resource Management.** Contact: Arthur Messenger, Association for Computing Machinery, Professional Development Committee, P.O. Box 39110, Washington, D.C. 20016.

Oct. 22, Washington, D.C. — **MIS: A Humanistic/Technological Approach.** Contact: Arthur Messenger, Association for Computing Machinery, Professional Development Committee, P.O. Box 39110, Washington, D.C. 20016.

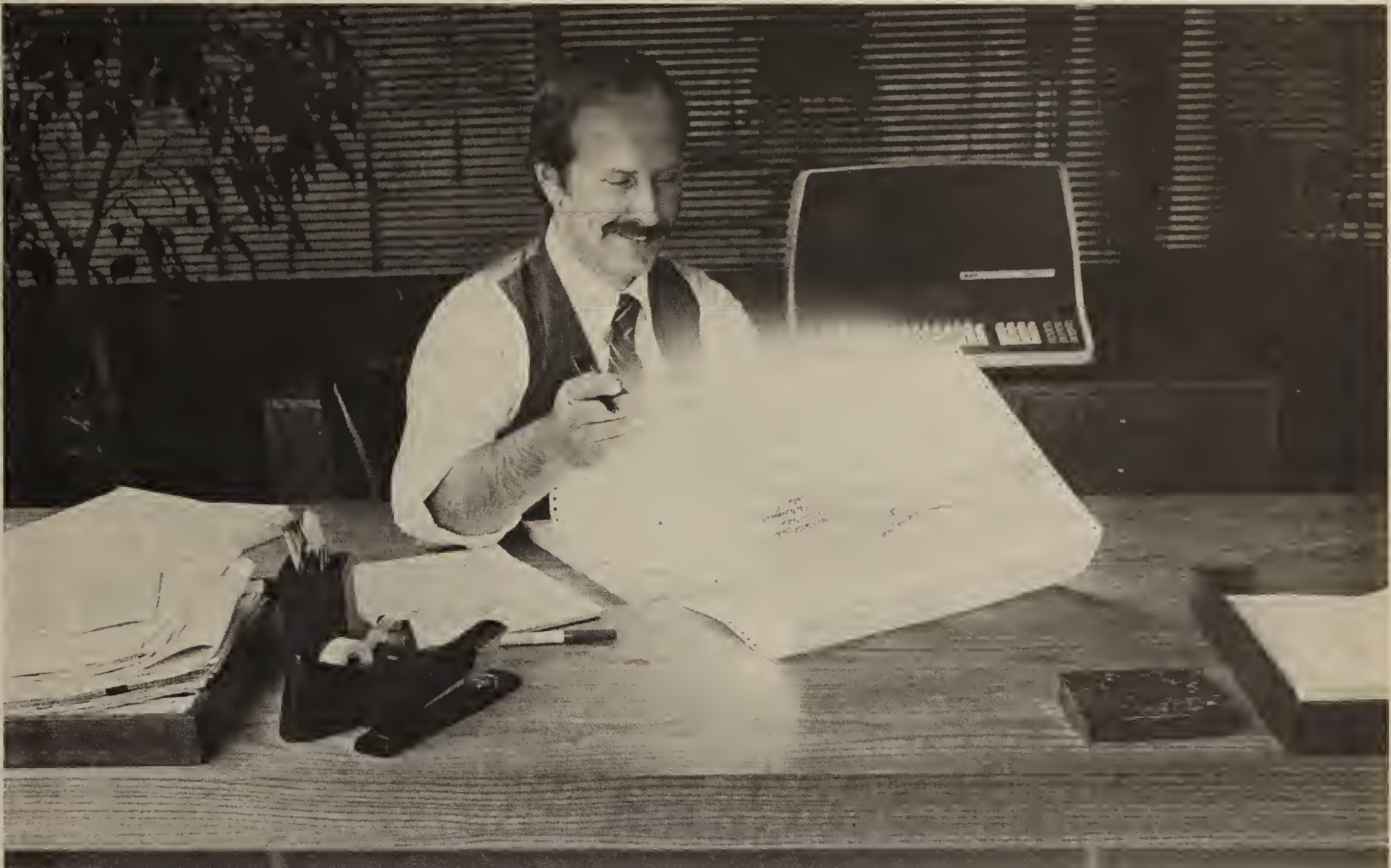
Oct. 22-23, Washington, D.C. — **Association of Public Data Users: 1981 Annual Conference.** Contact: Patricia C. Becker, APDU Annual Conference Program Chair, Planning Department, 3400 Cadillac Tower, Detroit, Mich. 48226.

Oct. 22-23, Piscataway, N.J. — **IMS/Data Communications Applications Programming.** Contact: I. Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

Oct. 22-23, Chicago — **IMS/VS Data Communications Programming.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

Oct. 22-23, New York — **Electronic Mail: The Message System Approach.** Contact: Mary Gillis, BBN Information Management Corp., 68 Moulton St., Cambridge, Mass. 02238. Also being held Oct. 29-30 in Chicago.

Oct. 25-27, Houston — **Micro and Minicomputers Continued, But Remember the Large-Scale Systems?** Contact: Herbert F. Rebhun, University of Houston Downtown, No. 1 Main, Houston, Texas 77002.



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Rarely has one man held such a godlike influence over a business entity as did Thomas J. Watson Sr., for 40 years the inspiration, leader and partriarch of IBM.

The acknowledged leader of the computer industry for almost three decades, IBM owes its success largely to the tastes, beliefs and ideals of Watson, who almost singlehandedly elevated his company to a level rivaling that of organized religion.

Indeed, IBM in its early days was infused with a decidedly religious tone, featuring fervent revival meeting-type conventions, group singing, inspirational slogans and the ever-present (benevolent but unpredictable) father figure of Watson overseeing his carefully groomed universe.

Watson became so influential, in fact, that he not only enjoyed close relationships with three American presidents, but entertained the most important political and social figures in the world.

How did he do it? How did a backwoods peddler from Painted Post, N.Y., grow to build an empire that today — 25 years after his death — has operations in more than 100 countries and employs over a quarter of a million people?

The answer lies in Watson's strong personality, high ideals, his ability to learn from others, and his ability to learn from his own mistakes. On a road that was not always smooth, Watson repeatedly turned the most discouraging circumstances into opportunities through his ingenuity and remarkably strong force of will.

The story begins simply enough with the birth of Thomas John Wasson on Feb. 17, 1874, to a brawny, tough lumberjack and his wife. "Wasson" was a permutation of the original family name, "Watson," from Scotland and Ireland. When a family member married a Catholic and settled in Brooklyn, N.Y., the rest of the family attempted to disassociate itself from Catholicism by changing its name en masse.

It was Tom's father who, after 30 years of being a Wasson, decided to conform to the surname tattooed on his arm and again became a Watson, as did the rest of his household.

Young Watson's childhood was largely uneventful. Neither studious nor athletic, he reportedly was lively and assertive, with a quick temper that was to plague him all his life. He spent much time helping run the family farm: training horses, harvesting and topping trees.

As his own son, Thomas J. Watson Jr., would later say: "He grew up in an ordinary but happy home where the means, and perhaps the wants, were modest and the moral environment strict. The important values, as he learned them, were to do every job well, to treat all people with dignity and respect, to appear neatly dressed, to be clean and forthright, to be eternally optimistic and, above all, loyal."

Not only would Watson retain those same values throughout his entire life, but he would see them successfully instilled in thousands of his own workers during the nearly half century that he held the corporate reins at IBM.

His father, with little formal education himself, held high ambitions for his son and advised him to become a lawyer. Young Watson, however, tended toward a teaching career and tested the waters by becoming a substitute teacher.

It took merely one day for Watson to make up his mind. At the end of that day, he concluded, "That settles my teaching career. I can't go into a schoolroom with a bunch of children at nine o'clock in the morning and stay 'til four."

Watson's next alternative proved to be a truer love: He would go into business. After a year at the Miller School of Commerce in Elmira, N.Y., studying accounting and business, Watson landed a job as a bookkeeper in a meat market.

The year was 1892 and his salary was $6 a week. Although the money was considered good, the challenge was less than compelling. "I couldn't sit on a high stool and keep books all my life," he said.

Fate was to come to Tom Watson's rescue in the person of George Cornwell, a traveling salesman who dealt in pianos, organs and sewing machines. Cornwell offered Watson a job as his assistant at $10 a week, provided he could supply his own horses to pull the wagon.

Thus began a spirited adventure through country fairs and dozens of small villages that was to remain one of the fondest of Watson's memories throughout his long and distinguished career. The open road cast its spell on Watson, and he would never cease to be a traveler.

When Cornwell left the company, Watson was assigned his territory, "and that was the most responsible job I've ever had from that day to this," Watson recalled years later. "And I felt more important in it than any position I've ever held, because I was the general manager, sales manager, accountant, deliveryman — I was the whole organization."

By 1894, Watson's father, whose farming enterprise had been plagued with bad luck and natural disaster, counseled his only son to leave Painted Post. While he might make a living there, it was no place to spend a lifetime, he felt.

So, on to Buffalo went Tom. There he found a short-lived job selling sewing machines, followed by a job with the Buffalo Building and Loan Association selling stock to the public to finance the company's growth.

While arranging a transaction for Buffalo Building and Loan at the office of the National Cash Register Co., Watson applied for a position as salesman. It took several attempts, but finally Watson convinced manager John J. Range to hire him in October 1895.

Watson found himself face-to-face with the country's first canned sales approach, as presented in the *NCR Primer*. The brainchild of NCR President John H. Patterson, the sales pitch had been adopted in 1887 and comprised a word-for-word transcript of the pitch used by the company's best money-earner.

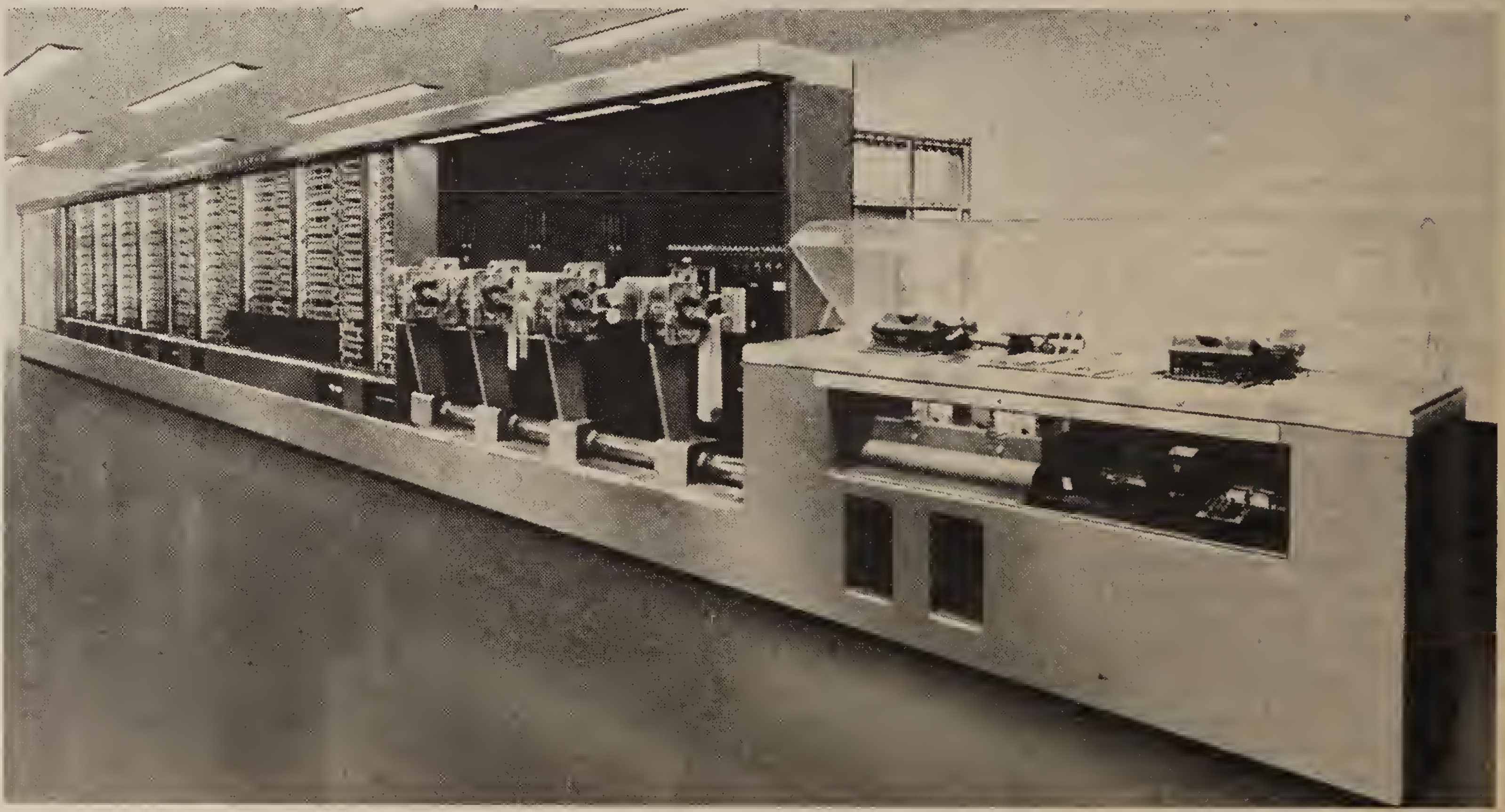
Watson at first had absolutely no luck selling cash registers. After Watson worked 10 days without a sale, Range lit into the young man with a harsh speech designed to open his eyes to the realities of selling.

Open his eyes it did, and just when Watson had decided he would quit his job at the end of Range's speech, the tone of the tirade changed completely, and Range suggested the two of them go out together and try again to sell some machines.

Watson's experience with Range

Courtesy of IBM

Thomas J. Watson, Sr.



Courtesy of IBM

IBM's first computer — the Mark I.

Part 7 . . .
Thomas J. Watson Sr.: The Businessman's Businessman

By Marguerite Zientara
CW Writer/Analyst

taught him two major things. From him, Watson learned his devastating technique of "ripping a man apart and sewing him up again" and he also learned to sell.

Four years later, at the age of 25, Watson was promoted to manager in Rochester. "The reason I was given that territory was that nobody else would take it," he claimed. But Watson did take it and from there began his dramatic climb to the heights of the business world.

In 1903, Watson's reputation was solid enough that he was chosen over 400 other salesmen at NCR to head a new, secret subsidiary. Selected partly because of his very obscurity, Watson was now slated to mastermind the feat of gaining control of all the secondhand cash register business in the country.

It was NCR's success in producing long-lasting machines that led to the disturbing situation of competitors making a profit selling NCR products. The plan now was to launch a well-financed, well-organized frontal attack on those operations. No one was to know of its connection with NCR.

Seeing the enterprise as a personal opportunity, Watson took on the assignment with enthusiasm and soon proved his talents as an executive. Falling to his cutthroat assignment, Watson established stores next to successful competitors, copied their successes and discarded their unsuccessful methods, undersold them, hired their salesmen away from them and eventually put them out of business.

It is said that Watson always regretted his experiences during those years and rarely mentioned them. On the other hand, his tactics were as fair as they could be under the circumstances. He always treated his competitors with consideration and offered generous settlements, often even hiring the bereft businessman as well as buying him out.

By 1907 the secret was out and NCR announced that Watson was in charge of the secondhand business of the company. Now the third most powerful man at NCR, Watson was 33 years old.

Patterson soon displayed his notorious flamboyance in a gesture meant to show his appreciation of Watson's years of dedicated hard work. During a visit to Watson in his hotel room, Patterson commented, "I don't think this is the address you ought to have. I'm going to build you a house."

Build Watson a house he did and would not accept rent payments. Furthermore, Patterson soon furnished Watson with a classy Pierce-Arrow.

In the midst of Watson's material good fortune, he met the woman who would stand by him through thick and thin — beautiful, well-bred Jeannette Kittredge, daughter of a successful Ohio businessman.

Watson was 38 and Jeannette 29 when they met in the spring of 1912. A year later they were married. As a wedding gift, Patterson presented them with a summer house especially built near his own summer home. Less than six months later Patterson would fire Watson.

Watson was one in a long line of distinguished men whom Patterson fired. The president was known to cultivate strong, intelligent advisors until they reached a point where Patterson felt they were overstepping

(Continued on Page 46)

Courtesy of IBM

The Columbia University Statistical Bureau, begun in 1928 with three truckloads of loaned IBM tabulating equipment.

Courtesy of IBM

Early IBM factory, circa 1925.

(Continued from Page 45)

their bounds. The end was swift and often severe, as in the case of one executive who returned from a trip to find his desk and chair in flames outside the factory.

Watson's end at NCR was not quite as dramatic and ended a period of months during which the two men's relationship grew more and more difficult. Patterson reportedly grew increasingly envious of Watson's popularity with the sales force, but the final catalyst was a disagreement over company policy.

Not only did Watson disagree with a proposed policy of Patterson's, but he disagreed with Patterson in front of other company executives. Suddenly, Watson's access to Patterson was reduced to almost nothing, and within weeks Watson got the word that he was no longer wanted.

Three months short of 40 and two months short of fatherhood, Watson was without a job. As he left his NCR office for the last time, he reportedly said, "I've helped build all but one of those buildings. Now I am going to build a business bigger than John H. Patterson has."

Deluged with job offers from successful companies wanting to pay him a large salary for his proven abilities, Watson instead wanted to assume leadership of a company, work only for a commission and share in the firm's profits.

Watson found the perfect environment for his talents in the newly formed Computing-Tabulating-Recording Co. (CTR), a result of the merging of Herman Hollerith's Tabulating Machine Co., International Time Recording Co., the Dayton Scale Co. and Bundy Manufacturing Co. [CW, Sept. 7].

Watson started at CTR in 1914 with a yearly salary of $25,000 and an option on 1,220 shares of stock. After three months, Watson was president; his principal goal was to bring CTR to a position of technical advancement in the face of a growing need for automatic calculation.

With Hollerith losing interest in technical innovation as he felt company control slip from his hands, Watson recognized the need to forge ahead with research and development, especially in light of superior equipment being produced by inventor James Powers' Powers Accounting Co.

THINK

Watson's most famous slogan, first introduced at NCR, demonstrates his love of the simple, direct exhortation.

Powers reportedly had a statistical machine that printed results as opposed to Hollerith's hand posting, featured an electrical punch instead of Hollerith's hand-operated one, and a horizontal sorter in place of the inconvenient vertical sorter Hollerith had designed for crowded railroad offices. Worse yet, Powers rented machines for $100/mo while CTR asked $150.

In October 1914, Watson established a research department under one of Hollerith's men, followed two years later by a laboratory. It was there that engineer Clair D. Lake invented a superior printer/lister that saved the Tabulating Machine Co. from ruin.

At the first combined sales meeting of CTR in 1919, Watson dramatically unveiled the machine and, with the flick of a switch, the device began printing results as cards flowed through it. Salesmen stood up in their chairs and cheered, feeling they were at the gateway to commercial success at last.

And they were. The Tabulating Machine Company was to revolutionize its industry in a move from accounting to data processing and global communications and in the forefront of a technology that great men of all centuries had dreamed of, but had been unable to achieve.

Six years after Watson joined the company, CTR's gross income had more than tripled, from $4 million to almost $14 million. The year 1920 saw the firm doing more business than it had done in the previous four years combined.

In spite of a recession in 1921, the company carried on — largely because of the faith and money extended by Guaranty Trust Co. By 1924 stockholders were receiving dividends three times greater than in 1913 and the market value of the

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stock was more than five times its earlier worth.

In 1924, Watson became chief executive officer of the company and its name became International Business Machines — "International" to suggest the projected scope of its influence and "Business Machines" to indicate the diversity of its interests.

Watson was now completely in charge and began a campaign to impress his distinctive personality on the organization. Watson felt that his workers should exhibit loyalty, unity, idealism, enthusiasm and spiritual commitment. "You have to put your heart in the business and the business in your heart," he said.

The extreme loyalty Watson exacted from his men became known as the "family spirit," and if anyone felt a bit too put upon by the emotional demands of a paternalistic chief executive officer, out the door he went. Those who left walked away from a religiously nonunion company that offered its employees a country club, educational programs and gala celebrations that stemmed from Watson's love for ceremony, luxury and impressive outward appearances.

During the Depression years of the 1930s, Watson was victor instead of victim. Although the office equipment industry suffered a 50% decline at that time, IBM held steady.

Instead of laying off large numbers of workers, he continued his building program and churned out more equipment to be stored for future use. In 1935, when the newly created Social Security System cast about for someone to do its bookkeeping, it was IBM's huge surplus that guaranteed it the contract.

Other New Deal agencies and social changes helped make IBM into a veritable giant. Legislation was being passed requiring very detailed recordkeeping in every phase of business and government. In the last half of the '30s, the income from IBM's electrical accounting machines doubled. By 1940, the firm was doing more business than any other office equipment company. Its course was set.

Watson's involvement with New Deal contracts led him closer and closer to Washington. As well as defending business interests to the Roosevelt administration, Watson spoke well of FDR's New Deal to the business community.

For his support, Roosevelt offered Watson the ambassadorship to Great Britain and the office of Secretary of Commerce, both of which Watson declined. Watson did, however, turn his attention to building up a European organization for IBM. His efforts culminated in the organization of IBM's World Trade Corp. in 1949.

"World Peace Through World Trade" became IBM's slogan. As president of the International Chamber of Commerce, Watson became so well-known through his speech making that many foreign subsidiaries were named Watson Business Machines.

When World War II's hostilities began in Europe, Watson put all the IBM facilities at the government's disposal. Besides performing accounting tasks arising from the war, IBM factories actually produced rifles and rifle parts as well as parts for aircraft engines. For his cooperation with government objectives, Watson received the Medal of Merit.

It was during the war that IBM entered the computer business, largely in response to the innovative ideas and financial needs of the inventor Howard Aiken, then at Harvard University.

Aiken, like previous computer pioneers, was concerned with the vast amounts of calculations necessitated by science, technology and government. After reading the original works of Charles Babbage concerning his theoretical Analytical Engine [CW, July 27], Aiken wondered whether existing calculators could be combined into one super calculating machine.

Specifically, Aiken wondered about IBM's highly successful 601 Multipliers, but soon concluded that any such project would have to start from the ground up, as opposed to resulting from the combination of several existing machines.

(Continued on Page 48)

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(Continued from Page 47)

Approaching IBM's extremely respected inventor, James Bryce, Aiken broached the possibility of such a project. Upon Bryce's presentation of the idea to Watson, whose faith in science and technology was boundless, $500,000 was made available for development work.

The war threatened to stop the project before it began, but when the Navy — in which Aiken was a lieutenant — realized the value of such a device to naval problems, Aiken was released on detachment to complete the work. IBM assigned an engineering team led by Clair Lake to help Aiken, and the project was under way.

Five years later, in 1944, the Automatic Sequence Controlled Calculator — familiarly known as the Mark I — was unveiled. Measuring 51 feet long and eight feet high, the Mark I contained about 800,000 parts and offered 60 registers for constants, 72 storage registers for addition, a central multiplication and division unit and could compute elementary transcendental functions such as logarithms and sine. It contained over 500 miles of wire.

The device could handle 23-decimal-digit numbers and perform additions in 0.3 seconds and multiplications in three seconds. One and a half minutes were needed to determine a logarithm to 20 decimal places.

Considering his accomplishment "Babbage's dream came true," which it certainly was, Aiken made an unfortunate misjudgment in taking full credit for its development. On the eve of the presentation ceremony, Aiken is said to have introduced the Mark I to the press without acknowledging Watson's and IBM's part in its development.

As a man who enjoyed getting the credit due him, Watson was enraged by Aiken's action. "I'm just sick about the whole thing," he reportedly said. And to Aiken he stormed, "You can't put IBM on as a postscript. I think about IBM just as you Harvard fellows do about your university."

In a bid for revenge and an attempt to eclipse the Mark I, Watson ordered his engineers to come up with a stunning machine. Before they could do that, however, the first electronic computer was developed at the University of Pennsylvania, in 1946.

The Eniac machine was revolutionary, featuring speeds and flexibility far beyond those of the previous electromechanical devices. IBM rose to the challenge, and in 1948 introduced the Selective Sequence Electronic Calculator (SSEC).

The Korean War and the competition, principally from Remington-Rand's Univac computer — delivered to the Census Bureau in 1951 — drove IBM to produce its Model 701, a scientific computer 25 times faster than the SSEC.

Shortly thereafter, IBM offered the 702, 704 and 705 models, which were so popular that competition began to fall away and the firm was on its way to becoming the leader in the computer industry.

In 1952, Thomas J. Watson Jr. became IBM's president and one week later, the government filed antitrust charges against the company. After three years of negotiations, Tom Jr. — much against his father's desires — signed a consent decree with the Justice Department.

A bit reluctantly, but recognizing the leadership consistently shown by Tom Jr., his father on May 8, 1956 gave over the position of chief executive officer to his son. On June 19, just more than a month later, Tom Watson Sr. died of a heart attack at the age of 82.

In the 40 years between 1914 and 1953, IBM had seen assets increase by a factor of 24, employees by 34, and data processing business by 316 times. Development expenditures had increased more than 500 times, manufacturing space had mushroomed and the educational program that began with impromptu talks had evolved into an annual program costing $50 million.

"Our greatest assets are men," Watson had always said. And of him, when he died, his minister said, "Integrity was the root of his character."

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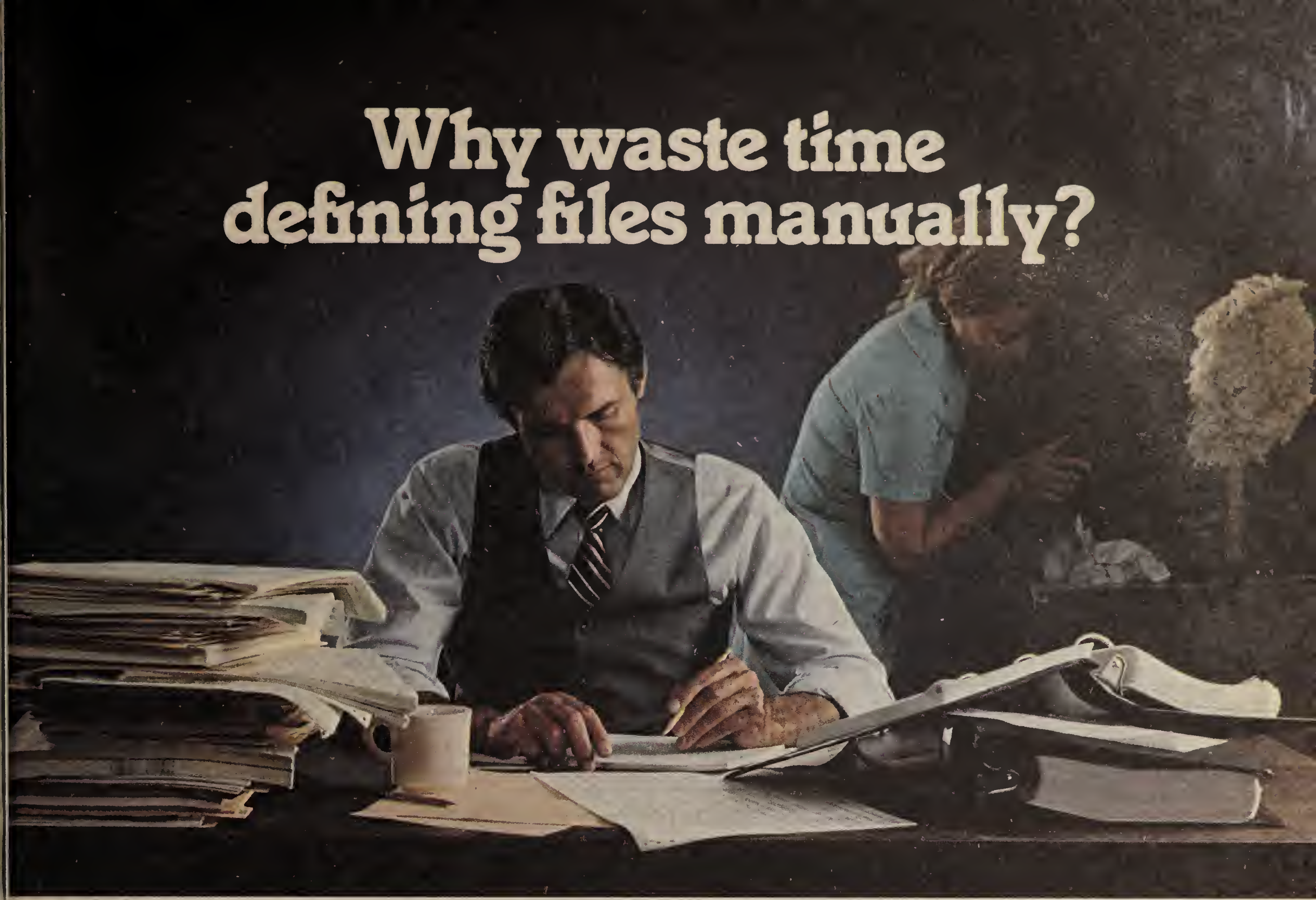
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EDITORIAL

New Twist in Job Threats

An important social impact of computer technology — replacement of people by machines — will take a new twist in the 1980s.

Until this decade, computers generally addressed mundane, repetitive functions that otherwise would occupy low-level clerical workers. While lacking the powers of reasoning and creativity, computers have eliminated jobs by outclassing humans in two ways: through computational speed and through massive storage capacities.

This threat to clerical workers will continue as another job threat generated by developments in technology comes to the fore: elimination of various managerial and professional positions by the products of artificial intelligence (AI).

Now a quarter-century old as a field of computer science, AI is on the verge of yielding products (generally sold as software) that infer from assumptions, deduce from facts, apply rules, extrapolate, generate algorithms and even converse like many humans in critical supervisory and advisory positions.

Major corporations like the multibillion-dollar oil-related manufacturer Schlumberger Ltd. are setting up AI projects and departments. Within the computer industry, vendors reportedly are implementing AI systems intended to boost production of computer equipment. It is less expensive to develop AI systems than ever before.

The threat these systems pose for many professionals and middle managers lies in their ability to rapidly learn a complex set of rules, rules for dealing with rules and shortcuts to problem solving known as heuristics. Many professionals and middle managers do that for a living already, but they cost more to maintain than machines do.

AI systems can now, or will soon, fit speech synthesis and recognition devices so humans can verbally interrogate them. AI systems will also serve to drive robotics and process control operations, eliminating the need for highly skilled manual laborers.

While much of the nation's blue-collar and clerical workers can fight automation through labor organizations, those professionals and managers threatened by AI systems normally lack such support in conflicts with employers.

Among the ranks of physicians and attorneys, AI systems may simply free professionals from relatively mundane chores of diagnosis, data base queries and journal researching. By and large, top management will see AI separate the more imaginative, resourceful and dynamic professionals from the rest who crowd conference rooms.

If top management replaces the latter with AI systems, a shocked multitude of college graduates will join many trade school and apprenticeship graduates in wondering what to do for a living. Their questions will not have easy and obvious answers.

DATA PAST

Five Years Ago
Sept. 20, 1976

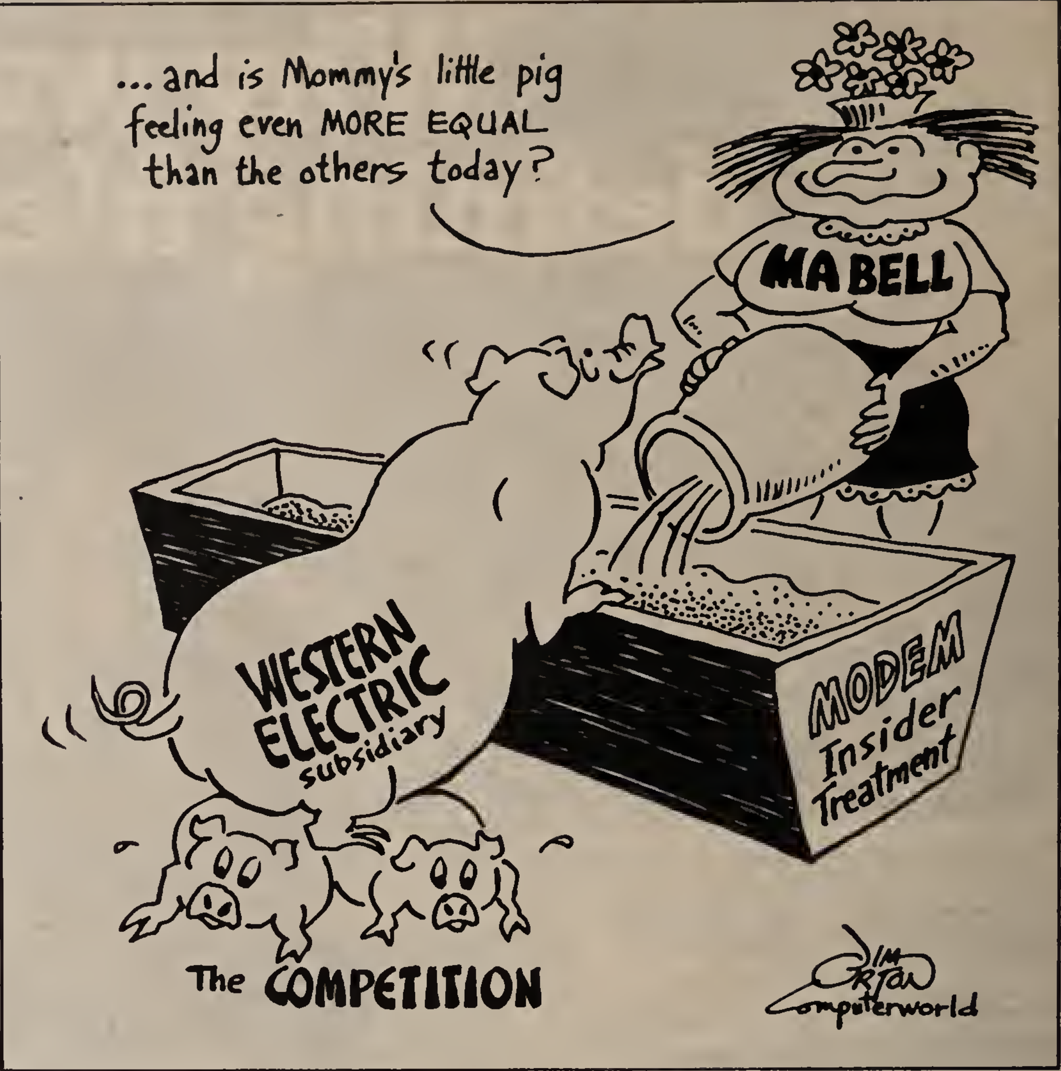
INDIANAPOLIS — Air controllers at the Indianapolis Air Traffic Control Center charged they were out of touch with aircraft in flight at least 126 times in a 40-day period because the Federal Aviation Administration's computerized air traffic system failed.

"We have no idea why the system is gone or when it's going to come back," Dave Morton, an air traffic controller, said.

Ten Years Ago
Sept. 15, 1971

NEW YORK — Digital Equipment Corp. became a full-fledged mainframe supplier for users to consider in evaluating acquisition of 370/135 through 370/155 size machines.

DEC last week expanded its Decsystem-10 line of computers by adding several new systems: a Decsystem-1040 (370/135 range), a 1050 (370/145 range), a 1070 (370/155 range) and two dual processor intermediates, the 1055 and 1077.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LETTERS

Inaccurate Chart

The chart with "Representative Sample of Personal Computers" [CW, Aug. 17] is shockingly inaccurate. The chart indicates the sources as IBM and The Yankee Group. I could understand such a self-serving picture being drawn by IBM, but I believe that *Computerworld* had an obligation to check the proposed chart, in its final form, with Tandy Corp., Xerox Corp., Commodore Business Machines, Inc. and Apple Computer, Inc. (big A), in order to make sure that the information was accurate and that apples (little a) were not being compared with oranges. The following inaccuracies and distortions were quickly noted:

- The TRS-80 Model II has a minimum configuration price of far more than $2,000, not $399 as published. The $399 figure probably refers to the TRS-80 "Color Computer" which is not really a competitor to the IBM entry or any other computer listed on the chart, competing instead with the Commodore VIC-20, the Atari 400 and others. Apart from the rows for minimum configuration, the information seems accurate for the TRS-80 Model II.
- The minimum configuration for TRS-80 Model III does not include diskette drives, especially not at the price quoted as the minimum configuration price.
- The minimum configuration for an Apple II is 16K, cassette and black-and-white TV, just as it is for the IBM entry. The price of this minimum Apple II configuration is about $1,100 as compared with IBM's $1,565. The usefulness of the minimum configuration of either the IBM entry or the Apple II is limited.
- The operating system published for the Apple II is correct but incomplete, since both CP/M and the UCSD Pascal p-System are currently available for the Apple II, whereas they will not be initially available with the IBM entry.
- The information listed for all the computers on the chart as "Maximum Number of Disk Drives" does not begin to reflect the on-line storage capabilities of the various computers. The capacity of the diskettes used varies greatly; some diskettes are 5¼ in. while others are 8 in.; some have single-density and others dual; some have 10 sectors per track and others 16. Finally, some of the systems permit the use of hard disks that dramatically increase the on-line capacity as well as the operational speed of those systems.

In addition, other business-oriented microcomputer systems that compete with the standard configurations of the listed systems are totally ignored. I realize that you couldn't include all the competing computers, but a "representative sample" should have included at least one from the group including North Star Computers, Inc., Cromemco, Inc., Hewlett-Packard Co. and so on.

I hope that *Computerworld* will take care to verify the accuracy and meaningfulness of information published in charts in the future. Charts are "eye catchers" and many readers will get their entire impression of an announcement or other event from charts and other "short cuts."

I believe your paper has a responsibility to make sure that such impressions are reasonably accurate.

Robert D. Baldwin
Chicago Title & Trust Co.
Chicago, Ill.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

SOFTLINE/Werner L. Frank

Why Another Language?

For the past two years, Ada has been given an enormous amount of attention in the trade and professional publications. Ada is, of course, the newest entry in the continuing search for better computer languages and implementation systems. The system is named in honor of the "first computer programmer," Ada Augusta, Countess of Lovelace, who lived in the early 19th century.

The role of the U.S. Department of Defense (DOD) in sponsoring Ada places a silver spoon in the mouth of this creation. DOD notwithstanding, other powerful forces behind Ada include the military establishments of England and Germany. This phenomenon currently ranks among the top topics of computer interest and discussion. Therefore, Ada must be taken seriously.

But, we ask, why another language? The answer is neither simple nor uniform. Let us cite a few views on Ada:

- A headline in the April 13 issue of *Computerworld*: "Turing Award Winner Warns of Ada's Dangers."
- A quote in the February 1981 issue of *Datamation* attributed to an authority on programming language design: "Do not allow this language in its present state to be used in operations where reliability is critical."
- An *Electronic News* column asked whether "DOD created a software albatross that has a limited cadre of programmers to support it and adopt it for military use."
- A feature story in *Minicomputer News*, Aug. 12, 1980, said, "At the moment, the new language Ada is literally a paper tiger, that is, a work of rhetoric and precise planning, but not an implemented reality."
- An editorial in the November 1979 issue of *Mini Micro Systems* expressed concern about a product sponsored by "a military establishment that's often perceived as an exasperating customer, and whose contributions to the advancement of technology, rightly or wrongly, are often viewed as destructive."
- And a *Business Week* article of March 23 carried quotes that Ada's complexity "might sink of its own weight" and its "standardization won't help because it takes a tremendous amount of retraining of programmers."

Committee Animal?

The most biting comment, however, comes from one of our industry's most critical observers, Herbert Grosch. Writing about Ada in the Aug. 21, 1980 issue of the British journal, *Computing*, Grosch referred to the old aphorism that describes the camel as being a horse designed by a committee. Ada, he said, was "suggested by a corrupt committee, specified by a lowest bid committee, designed by an overseas committee, trained by the Pentagon and promised to the knackers while still a foal."

Of course, as Herb and everyone else knows, a camel possesses qualities that a horse could never equal — namely, reliability and the ability to survive in an environment of extreme conditions.

There is, of course, another side to the coin, and we give due recognition to the more positive positions:

- A more recent *Electronic News* headline proclaimed that the "Ada language finds wide acceptance" and reported that a "rush is on to implement the new military programming language" by at least 25 publicly disclosed entities in the commercial, industrial and military communities.
- A favorable report in *Electronics* (Feb. 10) described the many advanced features of Ada and quoted the positive views of those who predict Ada will become the "ultimate language" and that "Ada will replace Fortran."
- A similar feature article in *Mini Micro Systems* (April) heralded Ada as a language system for shortening "the conceptual distances from problem to program" and supported the premise that it is "a significant software engineering tool."
- The entire June issue of the Institute of Electrical and Electronics Engineers' prestigious monthly magazine *Computer* devoted six articles to very positive reviews of Ada's current status and stated that it is "destined to become the dominant programming language of the 1980s."
- An *Electronics* article (Feb. 24) discussed the endorsement by Intel Corp. The Ada construct is favored as the basis for the architecture of Intel's multiuser 32-bit microprocessor, the APX432, and an early Ada compiler has been produced.

Other DOD Efforts

This is not the first time that the DOD has attempted to improve its own lot with respect to programming language uniformity. In earlier days, the motivation was primarily portability. The military did not wish to be too dependent on any one manufacturer, nor on any particular computer family, in what was then already a rapidly changing technological environment.

Indeed, it was the DOD that convened the industrywide Conference on Data Systems Languages which led to the specification of Cobol. Were it not for the DOD in the late '50s and early '60s, Cobol might not be the widely used language that it is today. But other efforts were less successful, such as the standardization sought by the DOD with Jovial in the mid-'60s. Even today, service-oriented standard languages such as the Navy's CMS-2 and the Army's TOS or Tacpol software systems are not expanding in use.

So what makes Ada different? Rather than portability as the primary objective, the current emphasis is on improving the software construction process based on the goals of:

1. Increasing programmer productivity.
2. Increasing the software's reliability.
3. Improving the implementation process for real-time systems.

The last of those three objectives is key to the military. It is directed toward alleviating the very large commitment (more than 50% of all computer activity) of expenditures which continually go into the development and operation of complex, real-time applications. These are the so-called "embedded computer systems" including communications, Command and Control, weapon systems and tracking systems.

Portability is, of course, still desired. In fact, to ensure this benefit, as well as achieve uniformity for other reasons, DOD has actually registered Ada as a trademark in order to enforce rigid adherence to the adopted standards. Correctness and completeness will, therefore, be essential if a system is to receive validation and be able to use the Ada label. Subsets or even supersets of the language will not, therefore, be endorsed and cannot use the name Ada. This restriction has also aroused some controversy. Some observers

(Continued on Page 54)

HUMAN CONNECTION/Jack Stone

'Problem' DPer Blames Personnel

Well, I've had some wild correspondence, but this letter ranks near the top of the list:

"I have just read your article "Hope — and Problem DPers — Spring Eternal" [CW, Aug. 24]. I consider myself, with no pride, a problem DPer and for the life of me cannot seem to correct the character deficits leading to my having to leave every programming job I have ever held.

"You might find it interesting to research my background and do an article on the history of an untypical DPer . . . My positions since 1969 are as follows."

12 Jobs in 12 Places

The writer proceeded to identify 12 — repeat — 12 jobs during the period in nearly a dozen different industries; so many, in fact, that he couldn't remember the exact dates of employment. Then he proceeded to identify his weaknesses, which says a lot about his candor and not too much about his desirability as an employee:

"I was noted most for being a good programmer, but was also noted for: being chronically late, having low productivity, complaining, never-ending problems, excessive absences, bizarre behavior, attitude of superiority, requests for transfer, starting rumors, lying, rudeness, insulting behavior and instability."

Taking a very broad view of the person, I would have to say that nobody's perfect. What's more, others apparently had the same notion because he had continuing income during his entire career:

". . . I never had a lapse in employment, which makes the hiring practices of many companies very weak. I was even offered positions at two very well-known and prestigious computer services organizations, but, for one reason or another, declined to accept them."

Common Thread

Then he identified a common hiring thread, which is well worth emphasizing here:

"I was never hired by anybody using a personnel department — always by the DP or programming manager."

The letter ended with this highly introspective observation:

"I would never hire me, but I seem to find work. I strongly suggest that professional personnel departments be used in the selection process."

I strongly agree with the writer's conclusion. Many DP managers treat the personnel department as little more than a major source of interference in the hiring process, a chronic irritant that impedes the acquisition of talented, albeit sometimes bizarre, computer programmers and analysts. I believe this is a mistaken position, because DP managers, I submit, tend to evaluate prospective hirees only in terms of their technical experience, and that only as limited to very particular machines and operating systems.

Questions like "tell me all the options available on the IF statement of Release 1.23 of the Cobol compiler for the XYZ machine" hardly help determine, for example, the ability of the prospect to communicate with users or work as part of a programming team.

Useful Services

Though my own experience with a personnel department when I was a corporate computer center director is many years removed, nevertheless, I always felt that it provided some very useful services, which I summarize for you below.

Specifically, the department can handle much of the hiring drudgery that DP managers so abhor, such as:

- Seeking out the most effective employment agencies to download much of the screening (and negotiating the best agency fees along the way).
- Conducting psychological and personality testing (to the extent permitted by company policy and law).
- Checking references and obtaining information on the social and personal behavior of a hiring prospect.
- Assessing the norms for salaries in the area.
- And, perhaps most important, providing an independent opinion of the qualities of a candidate relative to those of a long-term, productive employee.

LETTERS

TSO Defended

You ran a front-page article " 'Hero' Said to Best TSO in Programmer Support" [CW, Aug. 31]. We consider this article to be misleading and detrimental to our competitive product, VAM/SPF. Your article indicated the following:

"Hero and its main competitor, TSO, differ primarily in their addressing scheme. While the IBM system assigns each user to a different address space, the Software Authority's counterpart provides one large space that all users are allowed to share."

While this is no doubt true, there are far more major differences between these two products than just their addressing schemes. As a development system, Hero is incompatible to the IBM TSO counterpart. A user cannot replace TSO with Hero and run all — or even most — of his operations/applications that were running under TSO.

Comparing their two capabilities and indicating that their primary difference is the addressing scheme is like comparing Cobol with Fortran and indicating that their primary difference is their internal subroutine structure!

The Hero product is apparently based on a public domain version of the Wylbur family acquired from the National Institute of Health. While no doubt a viable product, the implication in this article is that Hero is a TSO replacement in the generally accepted sense, which is inaccurate.

Additionally, we believe the following statements to be false, misleading or confusing:

- "Hero can support up to 400 programmers on a 3033 with no more than 40% CPU." This statement requires support.
- "IBM's TSO system running on a 3033 allows no more than 60 to 80 programmers, where more than half of the 3033's capacity will be consumed at the 60-programmer level." This is not true; we know of installations that are running upwards of 150 TSO users on a 3033.

Our product, VAM/SPF, is a compatible TSO product. SPF applications running under TSO can therefore be moved to VAM in a totally transparent manner. They will run in one address space and they get significantly improved performance.

As a result of the inaccuracy of the *Computerworld* article, our potential customer base is now confused. The article, if complete, should have clearly indicated what the real functions of Hero are, and clearly defined it as a TSO alternative, not replacement.

Jack E. van Kinsbergen
President
Boole & Babbage, Inc.
Sunnyvale, Calif.

On Diagnostic Modems

I read with interest the interview with Saroj Kar of TCT International, Inc. [CW, July 20].

The article did not make it clear that there are other modems that allow users to invoke diagnostic tests anywhere in a data communications network from one central control point. AT&T, Intertel, Inc., Paradyne Corp., Racal-Milgo Corp. and Codex Corp. all provide diagnostic modem systems.

IBM uses the data channel to transmit test and command information so communications lines cannot continue to send data while they are undergoing tests.

All the other vendors mentioned provide nondisruptive diagnostics through a secondary channel.

Susan Aiello
Systems Analyst
New York Telephone
New York, N.Y.

NAS in PCM Race

In a recent issue of *Computerworld* there appears an article entitled "Plug-Compatible Race Heats Up as IPL Ships on Heels of IBM" [CW, Aug. 31]. I am especially intrigued by the claim made by IPL President Stephen J. Ippolito that "this is the first time a plug-compatible manufacturer [PCM] has been able to ship an IBM-compatible machine two months after IBM's first shipment date. Usually, PCMs ship products nine to 12 months after IBM, he noted." The article then proceeds to claim this exclusive for his 4341 Group 2-compatible machine, the IPL 4446.

In fact, National Advanced Systems (NAS) not only shipped its first 4341-2-compatible system more than a month prior to Ippolito's first shipment, it also took the unprecedented step in August 1980 of announcing its system prior to IBM's own 4341-2 announcement and correctly anticipating the features and capabilities of the 4341-2.

Nor was this an isolated case. NAS also announced its AS/9000 family of systems months prior to IBM's announcement of its 3081 and, again, made first customer shipment prior to IBM.

Just wanted to set the record straight.

David P. Goldsmith
Director — Sales Support
National Advanced Systems
Mountain View, Calif.

Squelching Innovation

A giant bravo for your letters [CW, Aug. 31], although the article "Adventures in Word Processing" by Jack Stone took my attention immediately. I have made copies of the article and distributed them to mem-

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LETTERS

bers of the staff.

I wholeheartedly agree with the article, but I must say I found it to be most amusing. I have been in the same situation only to find out later that a "prospective employer only wants a secretary with WP skills."

Two final questions I would like to add to that letter are:

Q: What did the secretary do or is now doing?

Q: How did the "boss" get to be boss by turning down innovative ideas for the future that have already been tried?

Keep up the good words.

Sheryl R. Bailey
Senior Secretary
Information Services
Cotton States Insurance Co.
Atlanta, Ga.

Libertarian Responds

In "Should a Systems Analyst Run New York?" [CW, Aug. 31], Judith Jones, the Libertarian candidate for mayor of New York City, expresses concern about whether programs or systems belong to the programmers or the companies for which they work. As both a programmer and a Libertarian I feel that:

- The products of my labor are my personal property just as is my life.
- I should be free to use or exchange my property (or life) as is mutually agreeable with another.
- My employment is a form of exchange. The products of my labor (programs and systems) are exchanged for paychecks. The programs would be mine except that by mutual agreement they are given up for money.

I agree with her reasons for the large number of DPers in the Libertarian Party. I am a Libertarian for many of the same reasons I am a programmer. I disagree with the headline's assertion that she would "run New York." Because she is a Libertarian I am sure she feels New York would do very well without bureaucratic interference.

Todd Caughey
Forest Lake, Minn.

'What Is the Mode Bit?'

I just completed the conclusion of the preview to *The Soul of a New Machine* by Tracy Kidder [CW, Aug. 24], and I must say it is well written and interesting. Who would ever think that the design of a machine could lead to such an interesting novel? I can hardly wait to get my copy.

However, I have one question that I'd like answered in layman's terms: What is the mode bit and what does its absence accomplish?

Henry A. Kolesnik
Englewood, Colo.

Cartoon Characters

I Have Been Reading CW For Years And One Thing Has Puzzled Me Throughout This Time. How Come Your Humor Cartoon Characters Start Each Word With A Capital Letter When They Talk?

Joe Rigo
Sysdoc, Inc.
New York, N.Y.

Good Laugh

Please pass my congratulations to Michael Artell, the creator of the cartoon containing the "LOGIC" and "GUT FEELING" boxes on the desk of the rather stumped-looking businessman.

I laughed out loud while looking at this gem and then I immediately cut it out and pinned it to my bulletin board.

I could not resist writing to let you and the cartoonist know how much I appreciated having a good laugh so early on a Tuesday morning (Tuesdays not generally being much of a laughing matter).

So, if you would please let Artell know this cartoon made the morning of at least one person out there, perhaps it will pass on some of the pleasure I received from the cartoon to it's creator.

All in all, I enjoy the more serious aspects of *Computerworld* as well as the humor — but with a cartoonist such as Artell adding to the most comprehensive coverage of the computer field, CW has to be first on my list of "must read" material.

Thanks for an excellent paper and the first good laugh of the week.

Cynthia Carpenter
Public Relations Administrator
Dylakor, Inc.
Granada Hills, Calif.

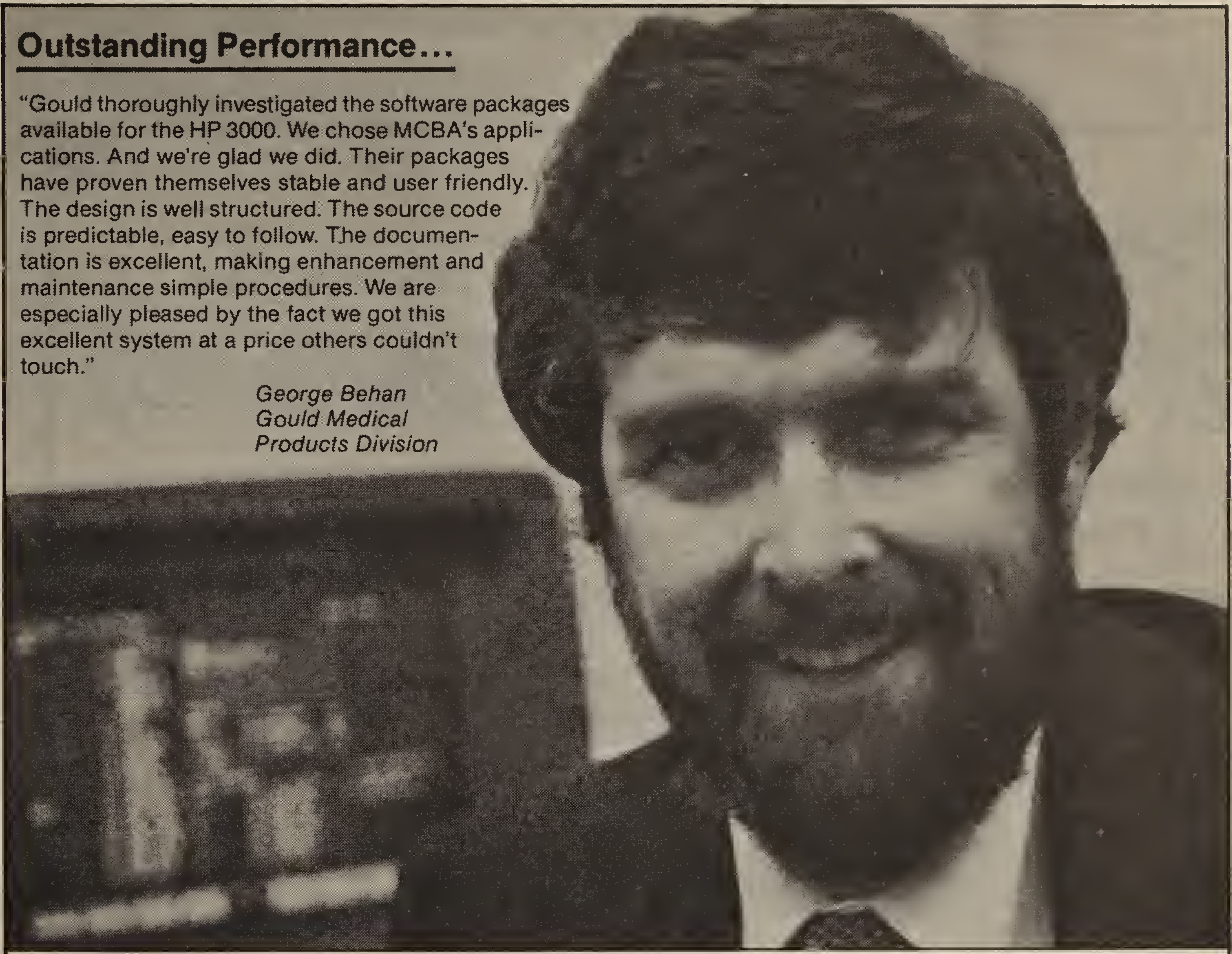
Ramis Not DBMS

I was surprised to read that Daniel McCracken thinks Ramis (actually Ramis II) is a relational data base management system (DBMS) [*Computerworld Extra!*, Sept. 1]. Ramis II is clearly modeled on the hierarchical concept of a DBMS. And, Ramis II files can be 'virtually' interconnected to approximate the network model.

State-of-the-art examples of relational DBMS include Relational Inquiry and Storage System (Riss), Forest Hills Hospital, Des Plaines, Ill.; Interactive Graphics and Retrieval System (Ingres), developed at the University of California, Berkeley, and offered by Relational Technology, Inc.; RDMS, MIT; and Oracle, Relational Software, Inc.

DBMS definitions aside, the *Extra!* edition reaffirms my belief that $36 a year is a steal for such excellent coverage of the DP field. Thanks.

Martin J. Ellison
Arcadia, Calif.



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LETTERS

Not Current State of PL/I

Peter van der Linden's article "Alternatives to Cobol: Ada" [*Computerworld Extra!*, Sept. 1], which compares PL/I to Cobol, does not reflect the current state of Pl/I.

Contrary to the text and example in Figure 2, PL/I includes (and has for many years) a SELECT/WHEN construct that fully implements the CASE function.

It is not generally true that automatic storage imposes a lighter total system load than static storage. In addition to occupying the same amount of memory while it is in use as static storage, it requires PL/I library routines to allocate, initialize and free it each time a program is entered. Space must also be allocated for constants used to initialize automatic storage. This can cause substantial unnecessary overhead.

The points I make to PL/I users are:

- Declare all variables. Any undeclared variables (which will be flagged by the compiler) should be considered errors. This avoids any invisible-type conversions or accidental creation of variables.
- Eliminate all error and warning messages. A program is not finished until it compiles cleanly.
- Take advantage of optimization facilities for execution and I/O. Choosing the right file and compilation options can reduce resource consumption by 30% or more.
- Develop, learn and remain within a personal subset of the language. Most programs can be written with a small fraction of the PL/I language and as a result one can avoid problems associated with less-traveled regions of PL/I facilities. An installationwide standard subset is a useful mechanism, as long as deviations are permitted when truly justified.

Gabriel Goldberg
Mitre Corp.

Stacked Deck

While I would be the last to tout Cobol for its terseness, and I certainly have nothing against Ada, I think Peter Van der Linden ["Alternatives to Cobol," *Computerworld Extra!*, Sept. 1] was using a stacked deck in his comparison of the relative verboseness of Cobol vs. Ada. His Cobol case structure example could have been coded more simply as follows:

```
IF code = "A" PERFORM process-a-
     code ELSE
IF code = "B" or "C" PERFORM
     process-bc-code ELSE
IF code = "D" PERFORM process-d-
     code ELSE
PERFORM process-unknown-code.
```

Although this alternative might not be considered "good form" by addicts of Cobol "prettyprinting" (myself included), it does have the virtue of being two lines shorter than the Ada example! For those really concerned about the national coding pad shortage, the entire exercise could have been coded in a single line of Mumps:

```
DO RTNA: CODE="A", RTNBC:
(CODE="B"! (CODE="C")), RTND:
CODE="D", TRNU;
```

Of course, a true Mumps programmer would never spell out "DO," preferring instead to use the abbreviated form "D."

William A. Seeley
University of Maryland
Baltimore, Md.

ADS Development

I found your *Computerworld Extra!* [Sept. 1] to be one of the most thorough and useful documents ever made available to the organizations involved in the Automated Data System (ADS) development process. One of the most pertinent and helpful articles was "Better Project Estimates for Better Decision Making." I view this as one of the neglected areas of life cycle management.

I hope this article will be a positive influence toward developing estimating standards for ADS development. I look forward to follow-up articles on this subject.

J.F. Sherrick
Director, Supply Management
Division
Stock Point Department
Department of the Navy
Mechanicsburg, Pa.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, *Computerworld*, P.O. Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Problem DPer Responds

(Continued from Page 51)

feel that such limitations will hinder the evolution and utilization of this language.

As this discussion illustrates, Ada is surrounded by controversy and strong opinions — both positive and negative. As one author said in the April 27 issue of *Infoworld*, Ada may be "another unwieldly, inefficient language like PL/I, or . . . a breakthrough in software technology."

But to reach a conclusion on this mixed subject, one must dig deeper into the technical merits and issues. This we will attempt in a succeeding column.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

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IBM Shipping Software Tool

Help Coming for 34-to-38 Conversions

By Lois Paul
CW Staff

ATLANTA — Help is on the way for users who have been moaning about problems in converting from IBM System/34 to System/38.

The basic bug in the conversion process reportedly revolved around the inability of the System/38 to read some of the floppy disks available for the System/34. IBM has begun shipping a software tool, it announced last January, to solve that problem.

It seems the System/34 will take single-density and dual-density, single-sided and double-sided floppy disks. However, users who attempted to convert to the System/38 found that system unable to read dual-density, double-sided floppy disks from the System/34.

The largest block the System/38 can read is 512 bytes, Hank Berkley, assistant vice-president for the Berkley Holding Corp. in Los Angeles, said. "So we have 400 or 500 floppy disks and there is nothing we can do but read them back onto single-density floppies and then read them into the 38."

No Problem

Madelene Lillard, a systems planner for IBM in Rochester, N.Y., said the new conversion package will solve this problem.

"It will not take System/34 diskettes and take those to the 38. What it does is take the actual data from the System/34 that is resident on the disk and then takes that data to the 38. You cannot use backup diskettes from the 34," Lillard said. She added that the conversion tool also generates the data description specification for the user.

Users can employ two-dimensional diskettes and the conversion aid will use these to transfer data from the 34 onto the 38 in basic data exchange mode, Lillard continued.

The new IBM software reportedly converts System/34 RPG source code, OCL, displays, sorts, menus and data files that can then be processed on a System/38. It is said to include user menu prompting, printing of converted code listings and printing of the conversion control log on demand for auditing.

Converted source code from the System/34 is unloaded to diskette in standard data interchange format, IBM said, and these diskettes are loaded onto the System/38.

The conversion aid is written in IBM Sys-

(Continued on Page 56)

Operations Utility Backs OS/VS Sites

SANTA CLARA, Calif. — Triangle Software Co. has announced the release of Prodict, an operations utility that reportedly maintains an on-line dictionary of all production jobs, job networks, data sets and programs for IBM OS/VS users.

Accessed through either time-sharing option or batch, Prodict is said to maintain an updated data base of relevant information about a production system. It produces terminal responses and reports to simplify system changes, the vendor said.

Prodict reportedly identifies and retains information on all backup and recovery operations. If a data set is lost, one Prodict command instantly displays the name of the backup data set and the job that does the recovery, Triangle Software explained.

Other commands were designed to pinpoint all jobs affected by a change to a program or a data set, all jobs dependent on the execution of another job when an execution schedule is changed and all resources used by any particular job.

The Product program also is said to generate the job-flow documentation for direct input into the operations run book. Its introductory price is $8,750.

A free 30-day trial is available by contacting Triangle Software Co. at 2651 Kentworth Way, Santa Clara, Calif. 95051.

IBM-Compatible Support Aid Released for Cobol Programmers

DENVILLE, N.J. — Haverly Systems, Inc. here announced an IBM-compatible system support aid for Cobol programmers.

Dubbed SGD, the software package reads the Cobol source code and creates and maintains an external cross-reference containing all data usages within the specified programs. It provides automatic resolution where programs refer to a given data element by different names and captures the data element attributes as well as the usages from the source program, a spokesman explained.

Manual input of the programs, files and records to be cross-referenced is required. However, approximately 95% of the work is handled automatically, he added.

Designed for IBM 370, 30 series and 4300 environments, SGD is priced at $14,500 under DOS and $18,500 for OS. Haverly is located at 78 Broadway, P. O. Box 919, Denville, N.J. 07834

PE Lops $5,000 Off Unix Price

OCEANPORT, N.J. — Perkin-Elmer Corp. announced a $5,000 price cut on the Edition VII Workbench version of the Unix operating system for its line of 32-bit superminis.

Introduced in May, the software was being jointly marketed by PE and The Wollongong Group, Inc. PE is now providing both marketing and software support for the time-sharing system, making it the only minicomputer manufacturer to offer a standard version of Unix as a fully supported off-the-shelf product, according to a spokesman.

Written mainly in C language, the package includes the basic operating system, high-level languages, text processing, electronic mail, graphics capabilities and computer-aided instruction. Languages besides C include Fortran 77, Pascal, Yacc, Ratfor and CAL.

The single-user version of PE Edition VII costs $20,000; the Edition VII Workbench costs $30,000. PE is at Crescent Place, Oceanport, N.J. 07757.

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IBM Ships Tool to Ease 34-to-38 Conversions

(Continued from Page 55)

tem/34 RPG-II programming language and reportedly executes under the control of the IBM System/34 system support program. The one-time charge for the conversion aid is $1,300, according to IBM.

IBM refused to release statistics on how many System/34 users are converting to System/38. However, the International Data Corp. (IDC) in Framingham, Mass., conducted a study of 161 System/34 user sites in May and found that 13 (39%) sites were planning to upgrade to System/38 within the next two years.

In a January study of 71 sites, IDC found that three of the 15 installations who had received System/38s were upgrading from System/34.

Charlene Yanchik, assistant vice-president of the Jersey International Group in Haddonfield, N.J., told *Computerworld* the biggest problem she experienced when trying to convert from the System/34 earlier in the summer was getting the System/38 to read double-density 1,024M-byte diskettes in a save/restore mode.

"The 38 does read the standard exchange, but evidently the 1,024M-byte is not in the standard exchange and it could not be read on the 38," she added.

She actually was converting from an IBM System/34 to a Wang Laboratories, Inc. VS system and wanted to employ the System/38 at the Tropicana Casino in Atlantic City, N.J., to aid the conversion. "We thought we'd use the System/38 and read them onto tape and then get them onto our Wang system," Yanchik said.

Jim Tennyson, a programmer/analyst with the Tropicana, said he was unable to help her. "With the 38 everything is object code, even the files. The problem was reading the physical file from the 34. It wasn't in the same format. We even tried a save/restore with the library . . . but even that wouldn't take it," he explained.

Yanchik attempted to get help from IBM and said service representatives there confirmed that the problem existed. They told her to put the double-density floppies back on the System/34, copy them in single mode (128M-byte sector mode) and then attempt the conversion.

Yanchik eventually resorted to a direct communications hookup between the System/34 and Wang VS computers.

Peggy Klein, a programmer/analyst with Harris Data Service, Inc. in Milwaukee, Wis., said she has had various problems in helping clients "convert anything to the 38." However, she said she has not experienced problems regarding floppy disk incompatibility.

'Or-Displayer' Aids System/34

VILLA PARK, Ill. — Software that reportedly allows IBM System/34 users to display any data on a workstation screen has been announced by Output Reporting, Inc.

Or-Displayer allows users to create programs to monitor accounts payable, review customer accounts, check cash flow or track the progress of jobs under way and do this more quickly than when programming in RPG-II, the vendor said.

Or-Displayer carries a one-time license fee of $2,750, Output Reporting, Inc. said from 140 West St., Villa Park, Ill. 60180.

System Geared To Wholesalers

YOUNGSTOWN, Ohio — An on-line, interactive software system of more than 600 programs for wholesale distributors using IBM System/34 computers has been developed by Robert Routman & Associates.

Said to cover every aspect of the wholesaling business, the Impact/34 system includes order entry, invoicing, accounts receivable, inventory control, purchasing, price changes, salesmen, financial reporting, trucks, drivers, general ledger, warehouse production and a customized retail dealer program, according to the vendor.

Impact/34, documented with a 450-page manual, reportedly requires a minimum knowledge of computers to operate.

The entire system costs $30,000, but all users would not require all programs. More information is available from Robert Routman & Associates, Suite 205, 17 Colonial Drive, Youngstown, Ohio 44505.

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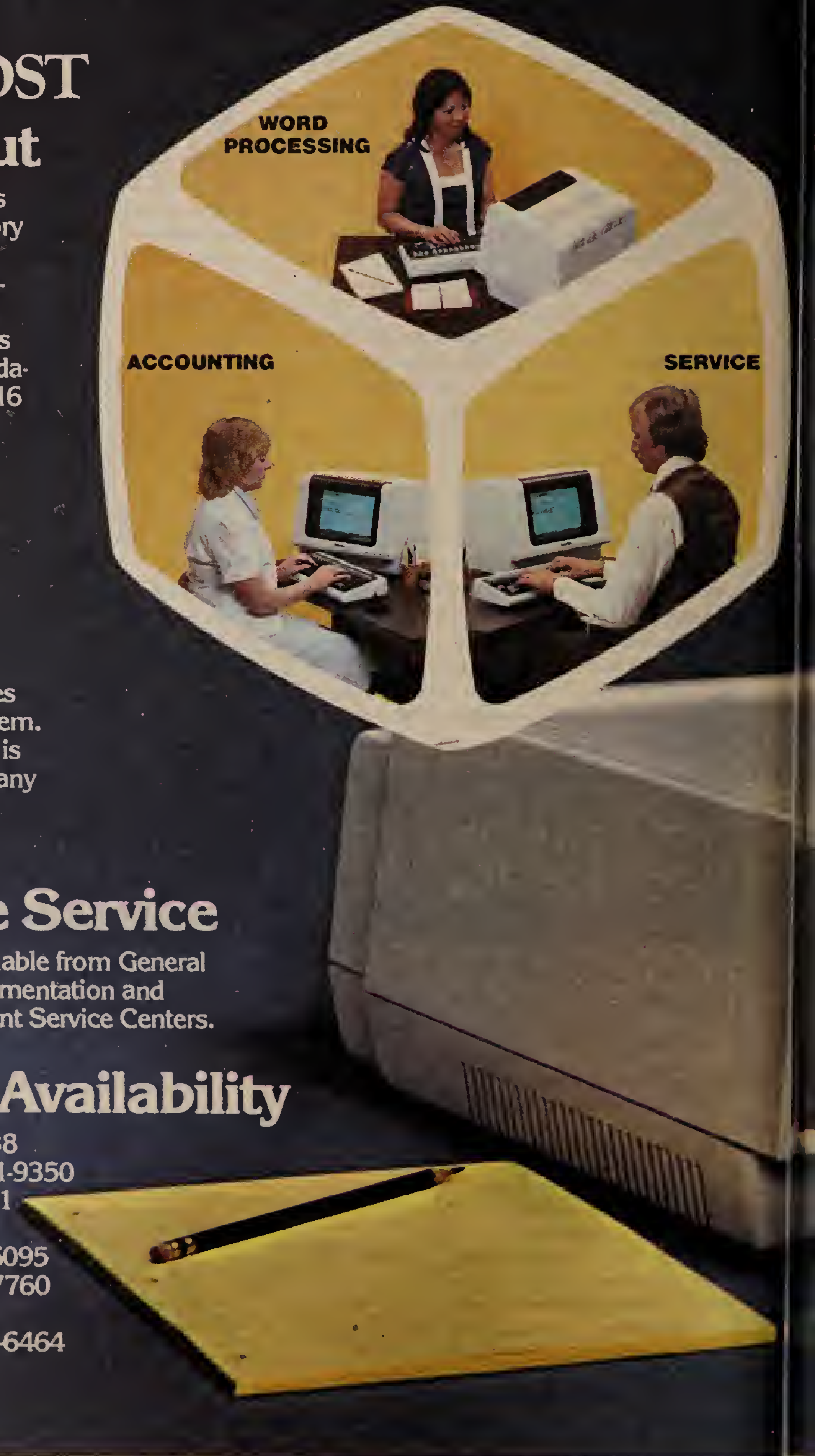

'Accounts Payable System' Runs in IBM Environments

DALLAS — An Accounts Payable System (APS) for IBM and IBM software-compatible environments was introduced here by Tres Systems, Inc.

Operating under OS, VS/MVS and DOS/VSE, the APS package employs separate data bases for multiple companies, vendors, invoices and banks.

The bank data base links all invoice activity with both issued and cleared checks and permits disbursing bank decisions to be made just prior to check preparation.

This feature reduces fund transfers and improves cash utilization, the vendor claimed.

The system allows invoice activity to interface with existing materials management or inventory control systems and a general ledger interface is also provided, according to the vendor.

A purchase order/receipts data base that allows document matching is offered as an option, according to the vendor.

Available immediately, APS sells for $35,000 including work flow analysis, requirements matching and an implementation plan, the vendor said.

Tres is located at 4255 LBJ Freeway, Dallas, Texas 75234.

'VIM' Links Vsam Clusters With Cobol, BAL or PL/I

NEW YORK — ISL International, Inc. introduced the Vsam Interface Module (VIM) that reportedly interfaces between Cobol, BAL or PL/I and possible Vsam clusters and accesses.

The software eliminates the necessity of learning either the complexities of Vsam internals or Cobol and Assembler Vsam syntax together with its inherent debugging, the vendor said.

VIM is said to include all the available facilities for each of the Vsam cluster types and to control as many Vsam files as necessary. The vendor said it works under any operating system involving standard Vsam macros.

The software was designed to make "execution-time" dynamic decisions, to handle simultaneously asynchronous requests, to maintain two concurrent positional pointers on all files and to issue "readable" characters for complex Vsam bit return-codes and non-Vsam user type errors.

It is reportedly accessable through a simple calling parameter from Cobol, Assembler or PL/I.

The VIM software is licensed at $10,000 for the first location and $7,500 per each additional location. Maintenance is free the first year and then is priced at 12% of the first location's permanent license fee, the vendor said.

ISL International, Inc. is located at Suite 1527, 250 W. 57th St., New York, N.Y. 10019.

Budget Extends Time-Sharing To 300 Cities

MARINA DEL REY, Calif. — Budget Time-Share, Inc., in expanding its services to more than 300 cities nationwide, is offering a free, 30-day trial period to new subscribers.

The company claimed it can offer time-sharing services at prices up to 50% lower than otherwise available by offering widely used, brand name software packages instead of proprietary software.

Budget's time-sharing communications network consists of privately leased lines and public packet networks developed in conjunction with Tymnet, Inc.

Cut Budgets in Half

Users currently spending between $5,000 and $10,000 per month on time-sharing reportedly can cut their costs in half, according to Budget Time-Share.

Budget offers users technical support in such areas as accounting, banking, finance, marketing, personnel, sales tracking and forecasting, statistics, manufacturing and engineering.

The firm is headquartered at 4739 Alla Road, Marina Del Rey, Calif. 90291.

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Package for DEC Machines Provides CPU-to-CPU Link

BEDFORD, Mass. — A computer-to-computer communications link said to be fully automated from a user's terminal has been announced by Clyde Digital Systems, Inc.

A user of Digital Equipment Corp.'s RSTS or VAX/VMS operating system may dial up and connect to a second CPU of any kind from his terminal. The user can then work as a remote user with the additional ability to transfer files from one system to the other. All types of disk files, including binary, may be moved between the two computers in either direction, a company spokesman said.

The package is supported by add-on hardware that supplements the dialing and transmission rate selection automatically. The package may also be used with a TWX system to send messages anywhere in the world, the vendor said. The software costs $1,845 from Clyde, P.O. Box 348, Bedford, Mass. 01730.

'Report Writer,' Accounting Tools Offered for DEC PDP-11s

MONTROSE, Calif. — Mini-Computer Business Applications, Inc. (MCBA) has announced a Report Writer and its Release 6 Accounting Packages in Dibol for Digital Equipment Corp. PDP-11s.

Report Writer interfaces with MCBA's accounting and manufacturing packages and can also be used with non-MCBA files. The user-friendly Report Writer, with a year warranty, costs $1,000.

The menu driven Release 6 packages — Accounts Receivable, Accounts Payable, General Ledger and Payroll — have been enhanced and Customer Order Processing and Inventory Management have been added to the list, the vendor said.

Release 6 costs $2,000 from the firm at 2441 Honolulu Ave., Montrose, Calif. 91020.

Utility Gives RT-11 Code Listings

STERLING, Va. — A utility said to produce structured code listings of Digital Equipment Corp. RT-11 Basic programs has been announced by Berman Associates.

Lister is said to print only one statement per line and to highlight blocks of REMARK statements. Additionally, Lister indents the program to indicate the structure of all FOR-. . . NEXT loops.

Lister is available in source code form for use on RT-11 systems for $99 per license. Berman Associates is located at Suite 14, 101 E. Holly Ave., Sterling, Va. 22170.

'Olpars' Fits VAX, PDP-11

ROME, N.Y. — An On-Line Pattern Analysis and Recognition System (Olpars) for Digital Equipment Corp.'s VAX-11/780 and PDP-11 processors has been announced by the Pattern Analysis and Recognition Corp.

Olpars is a graphics-oriented system that performs data structure analysis, measurement evaluation measurement transformation, logic design and logic evaluation, the vendor said.

Hardware requirements include graphics display with a graphics input capability, support for the ful floating point instruction set and 32K-byte words of user partition, the vendor said.

Olpars is priced at $20,000 from Pattern Analysis and Recognition Corp 228 Liberty Plaza, Rome, N.Y. 13440

Service Checks Rules' Status

WASHINGTON, D.C. — A time sharing service that provides information on the status of any federa government regulation has been introduced by Legi-Slate, Inc.

Called Regu-Late, the service operates 24 hours a day, seven days a week and helps users locate specific announcements related to their businesses or special interests. Updated daily from the *Federal Register*, information includes status of all federal regulations, presidential documents, proposed rules, advanced notice of proposed rule making and Sunshine Act meetings.

Searches are done by key words, government agencies or docket number. An average of 150 to 200 new entries are stored daily.

More information about the service is available from Legi-Slate at 318 Massachusetts Ave. N.E., Washington, D.C. 20002.

Installations everywhere are finding a way to unlock programmer productivity.

ACEP is the personal computing system that was specifically developed for IBM virtual memory control programs (VS1 and MVS). This system makes it possible to enjoy increased on-line productivity while using only a fraction of the resources required by older time sharing systems.

User Benefits

ACEP uses re-entrant programming and modular design. The result is a low overhead system that gives all of your users the tools they need for program development and maintenance. Using on-line (foreground) conversational tools they can: execute batch, on-line and utility programs; perform full or split screen text editing; and direct job output to preferred locations. Additionally, users can check both job and system status by reviewing items such as: job que, system catalog, library contents and other significant information. Users have their own libraries and multiple working areas. There are no JCL restrictions and data sets can be dynamically allocated.

Installation Benefits

Installations using ACEP benefit from its efficiency, simplicity and security. The system is so logical and straight forward that it is easy to install and easy to use. ACEP does not require modification of operating system routines and most programmers have it up and running in just half a day. Additionally, data access and command execution can be restricted at the user level.

ACEP, which has a constantly active "hotreader" for the VS1 system, interfaces to several source program maintenance systems and can be accessed through VTAM, BTAM, TCAM or existing CICS or Intercomm terminals.

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All Modules to 'CSS' Enhanced or Rewritten

ATLANTA — Major enhancements to a software system for shareholder account management were announced here by Informatics, Inc.

Every module within the Corporate Shareholder System (CSS) has been enhanced or rewritten, according to John Finch, CSS marketing director.

Operational improvements were derived from combining several functions into related modules, updating the language to Cobol-74 and modifying the system to run in additional environments such as Vsam, he said.

"A special feature ... provides a modification area within each module for user-developed coding [and] extensive comments and messages were included in each program to provide explanations of the functions of each module," Finch noted.

Several enhancements, notably incorporation of the nine-digit Zip Code as well as Canadian and other international Zip Code variations, were created to reflect changing business practices in corporate shareholder management, he said.

The CSS escheatment module was also upgraded. Escheatment is the process by which unclaimed dividends are turned over to state governments, sometimes at great cost to the "lost" stock or bond holder, he explained.

The escheatment system reportedly allows corporations to offset costs by providing the latest possible escheatment dates. "Between this system and those for dividend reinvestment, user corporations are finding they have vastly improved cash management of shareholder-related funds," Finch claimed.

Available immediately to all current CSS users at no additional cost, the system ranges from $42,500 for a basic batch environment to $160,000 with full on-line capabilities for new users. Additional information is available from Informatics at 340 Interstate N. Parkway, No. 387, Atlanta, Ga. 30330.

Illini 'Adds' Package for Use In Structured Analysis, Design

PAWNEE, Ill. — Software for systems analysts doing a structured analysis or structured design has been announced by Illini Software Co.

The Analysis Data Dictionary System (Adds) is a processor of data dictionary statements that handles relational definitions and structured English formats of data elements, data flows and data bases and processes, the vendor said.

The system also produces five reports from the analysts dictionary including source/edit and alphabetic listings and a cross-reference of undefined or self-defining names with their associated references, the company claimed.

Adds is priced at $500 from Illini Software Co., P.O. Box 684, Pawnee, Ill. 62558.

Lenker Offers Dictionary

RALEIGH, N.C. — Fritz Lenker and Associates, Inc. announced the addition of a fully integrated data element dictionary and thesaurus to its conversion software translator.

The dictionary enables correct translation of program verbs that are either flagged or ignored by other translators, the vendor claimed. It is an internal translator file containing the characteristics of every data element in a system, a spokesman explained.

As a thesaurus, the software relates elements by position in data records as well as by redefinition and renaming. A facility for changing or standardizing all data element names in a software system is also available through the dictionary feature, he said.

Lenker makes the conversion software translator with dictionary and thesaurus features available along with its consulting service. The price for a conversion can range between $25,000 and $50,000 depending on complexity, a spokesman estimated. Fritz Lenker and Associates is at North Hills Office Mall, Suite 244, 4208 Six Forks Road, Raleigh, N.C. 27609.

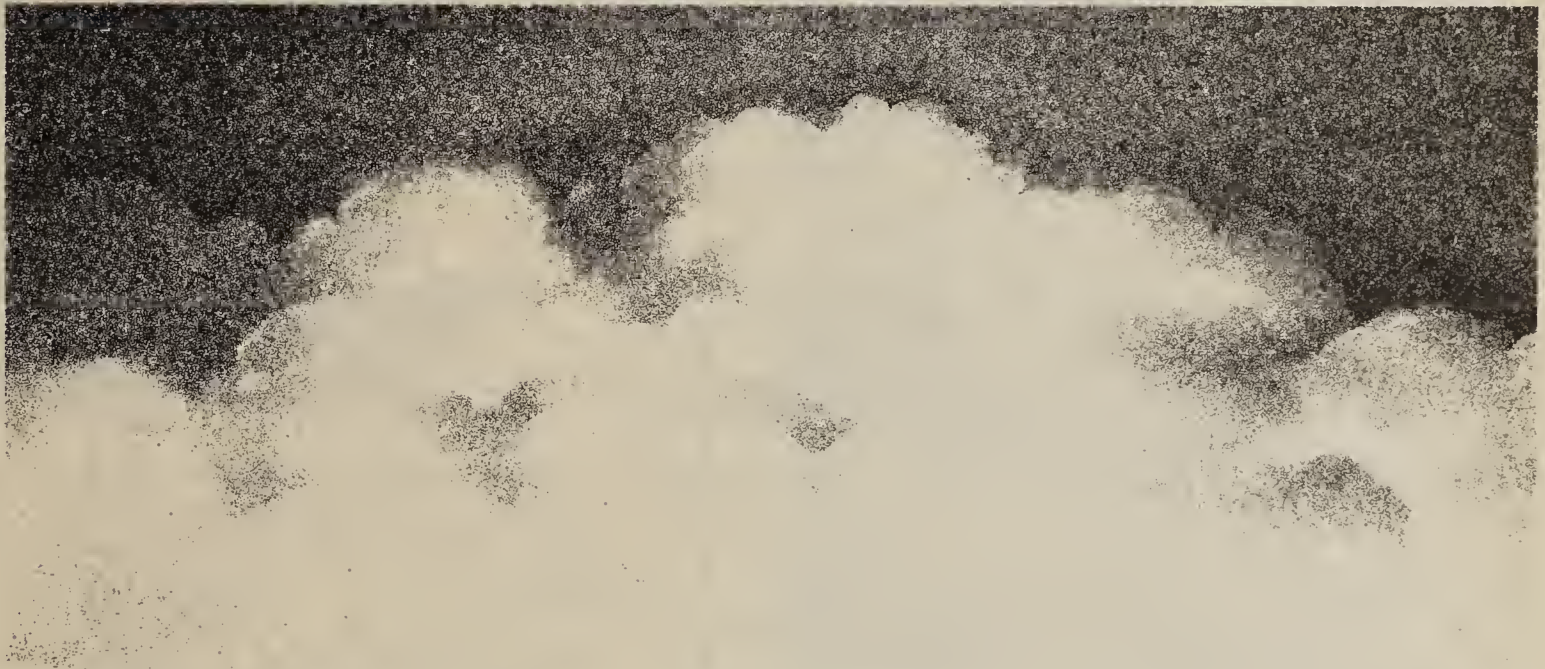
Program Aids In Road Design

PEORIA, Ill. — Engineering Computer Software has developed a civil engineering application program to semiautomate the design of a road segment.

The program is written in three modules and was designed to establish road grade, template and earthwork volumes. It reportedly can run on any minicomputer with an Ansi-77 standard Fortran IV compiler, the vendor said.

The program is available for $3,250, plus the cost of the tape or cards on which it is sent, the vendor said from 1605 W. Candletree Drive, Peoria, Ill. 61614.

IN THE BEGINNING...



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Runs on Any DG System

RDS Unveils Screen-Oriented Text Editor

NEW YORK — Rational Data Systems, Inc. (RDS) here introduced Scred, a screen-oriented text editor for Data General Corp. systems.

Designed to run under any DG operating system, Scred works with CRT terminals that support cursor addressing and scrolling.

It can also be configured to utilize features such as line insertion or character deletion.

This capability improves the editor's effectiveness and reduces I/O overhead at all speeds, the vendor claimed.

Versions for RDOS, DOS and MP/OS systems are priced at $850. The AOS and AOS/VS versions are optimized for multiuser environments and cost $1,000.

RDS will also be offering evaluation copies of Scred for $25, it said from 205 E. 42nd St., New York, N.Y. 10017.

Package Has 120 Currency Rates

DALLAS/FORT WORTH AIRPORT, Texas — A currency conversion package that contains current market rates for over 120 currencies is now available to Sabre subscribers through American Airlines and Deak-Perera, a foreign exchange firm.

The rates will be updated by Deak-Perera at least two times every business day and throughout the day as necessary. Subscribers can also order foreign currency of more than 120 countries, traveler's checks denominated in 13 major currencies and foreign drafts for 27 different countries.

There is a charge of $4 for each mailing of foreign currency and traveler's checks to cover the cost of insured registered-receipt delivery to subscriber offices. Foreign drafts are available for a $2 handling charge and wire transfers are offered for $10 per wire. More information is available from American Airlines, P.O. Box 61616, DFW Airport, Texas 75261.

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Cyborg Systems Enhances Payroll Package

CHICAGO — Cyborg Systems, Inc. has released a number of enhancements for its Payroll/Personnel system.

The software's on-line feature has been redesigned with screen formats that work in three modes. Users can be restricted to inquiry only, data entry only or a combined inquiry/entry mode.

Other new capabilities include a net-to-gross feature that enables users to enter a net amount of payment through a time card and a tax adjustment feature that permits the collection or refunding of withholding taxes for federal and state tax bodies on the standard time card.

The personnel portion of the system has been enhanced to include a benefits register, annual benefits statement, position control report and affirmative action and applicant tracking and reporting capabilities.

Available immediately, the enhanced payroll/personnel system costs approximately $75,000 from Cyborg at 2 N. Riverside Plaza, Chicago, Ill. 60606.

Data Law Offers WP Tool

ENGLEWOOD, Colo. — Data Law Co. is offering an enhanced version of Datalaw System/2, an integrated, on-line, real-time system for law firms with two to 100 attorneys and Versos, a word processing program. Both run on IBM hardware.

Datalaw System/2 will run on any IBM Series/1 and operates in a shared logic, multiprocessing environment using from one to 20 CRT terminals.

Versos runs simultaneously with Datalaw System/2. The IBM 3101 CRT terminals, which Datalaw System/2 uses, can also be hooked up to the Westlaw legal research system, giving the law firm an accounting, word processing and legal research system, the firm said.

The modules in Datalaw System/2 include time accounting, billing, cash receipting, accounts receivable, general ledger and a set of management reports. Also included is a docket control/reminder system.

Datalaw System/2 costs $16,000 and Versos costs $3,000 from the firm at 7308A S. Alton Way, Englewood, Colo. 80112.

'Shaman' Routes Bar-Coded Inventory

STOUGHTON, Mass. — A computerized production and control software package for textile and other manufacturers is available from Shawmut Technologies, Inc.

Shaman reportedly utilizes bar code tracking to route inventory from start to finish through a factory and offers user-friendly production control program and sophisticated hardware options.

The basic price for the software is $75,000. Shawmut can be reached through P.O. Box A, Stoughton, Mass. 02072.

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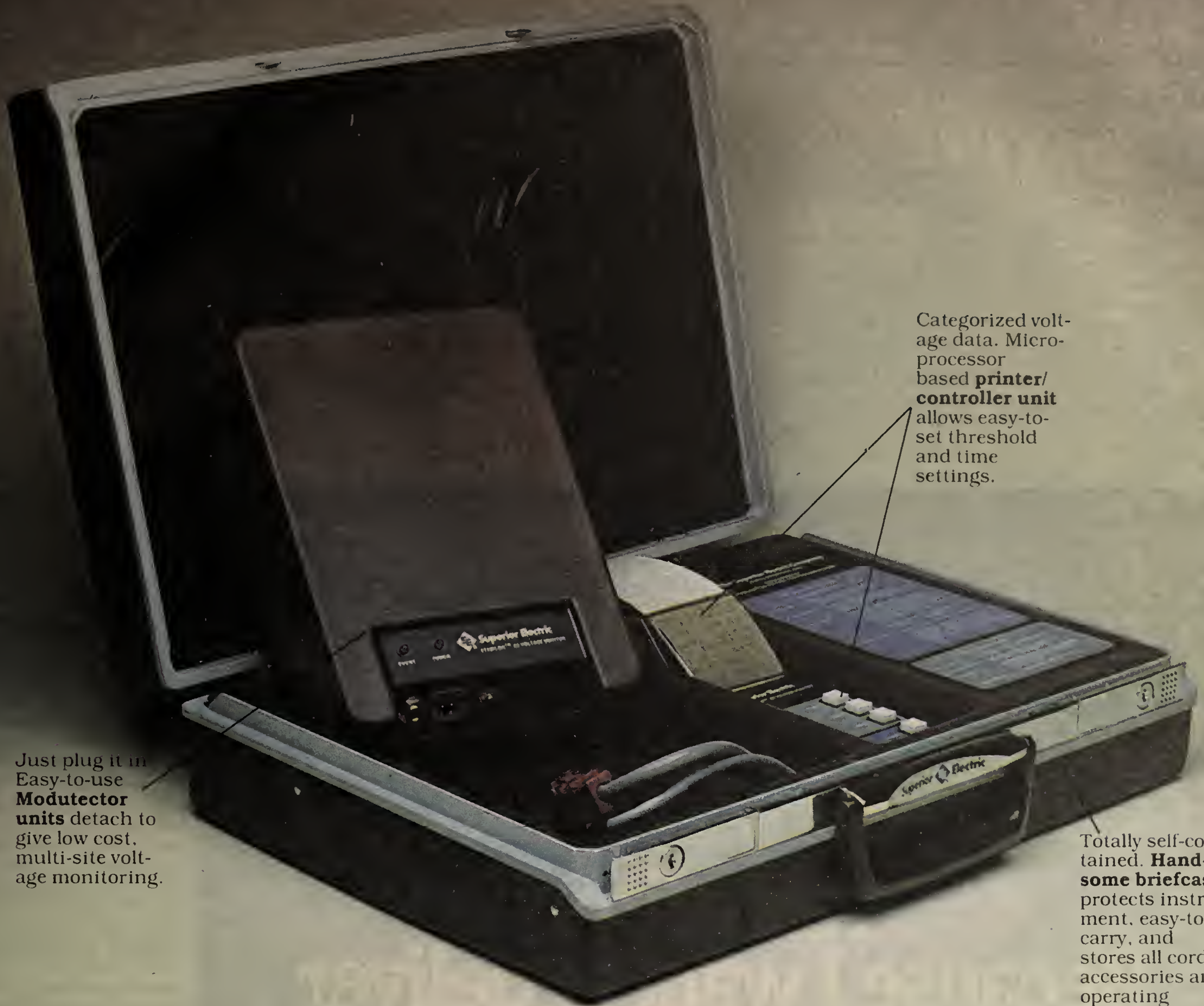

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Random Notes

Businesses Offered Litigation Reports

ANN ARBOR, Mich. — A series of computerized reports that businesses can reportedly use to avoid or respond to class action suits and other litigation is available on a time-sharing basis from Comshare, Inc.

The reports address issues in the areas of equal employment and affirmative action and form the third volume of the company's computerized personnel system called the Profiles Applications Library, based on time-sharing computers, according to the vendor.

The employment and affirmative action report series is transaction-priced from Comshare, Inc., 3001 South St., Ann Arbor, Mich. 48106.

Unix Version 7 Memory Increased

BATAVIA, Ill. — Uniq Computer Corp. has updated its Unix Version 7 operating system with an enhancement that reportedly doubles the amount of memory available for the operating system's programs and data structures.

The software, designed for Uniq Computer Engine models 23 and 34 systems, utilizes real-time memory bank switching.

Available immediately, the software price starts at $2,808 and varies according to the number of users and type of support required. Uniq is located at 28 S. Water St., Batavia, Ill. 60510.

'Staars' Produces Text Orders, Returns, Lists

ELMSFORD, N.Y. — The Standard Textbook Acquisition and Retrieval System (Staars), a package for the college or university bookstore, is being offered by Minicomputer Systems, Inc.

Staars produces textbook requisitions from analysis of historical data. Once verified by the faculty, want lists are produced for wholesalers, together with automatic production of purchase orders, returns, shelf tags and buyback lists. Reports detail the state of orders and physical inventory.

Staars, which runs on the firm's Micos hardware, is available for a monthly rental fee of $500.

The vendor is located at 399 Fairview Park Drive, Elmsford, N.Y. 10523.

'Cobol/1000' Fits HP 1000 RTE-IV

ABERDEEN, N.J. — An Ansi Cobol compiler designed to operate in the Hewlett-Packard Co. 1000 RTE-IV environment, which implements the Ansi X3.23 Cobol specifications, is being offered by Corporate Computer Systems, Inc.

Cobol/1000 reportedly will produce object code that will also run on HP's smaller L-series computers. When used in conjunction with HP's 3000 computer in a distributed processing network, Cobol/1000 provides a common language for all nodes.

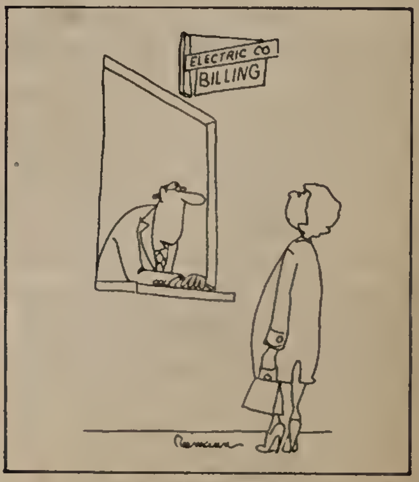
Relocatable binary licenses cost $5,000 with a right-to-copy cost of $2,500. A right-to-copy for the run-time library costs $200. The vendor can be reached at 675 Line Road, Aberdeen, N.J. 07747.

Boston Business Gets On-Line Accounting

CLIFTON, N.J. — Automatic Data Processing, Inc. (ADP) has announced an on-line interactive accounting system for manufacturers in the Greater Boston area.

Software applications include multilevel bill of materials, job costing, purchase orders, material requirements planning, work-in-process, raw materials and finished goods inventory control, order entry and standard accounting.

The noncontractual rental fees — including hardware, software, maintenance and applications support — range from $1,000/mo to $2,000/mo for a small on-line system to $1,800/mo to $4,500/mo for an on-site system. ADP is at 405 Rt. 3, Clifton, N.J. 07015.



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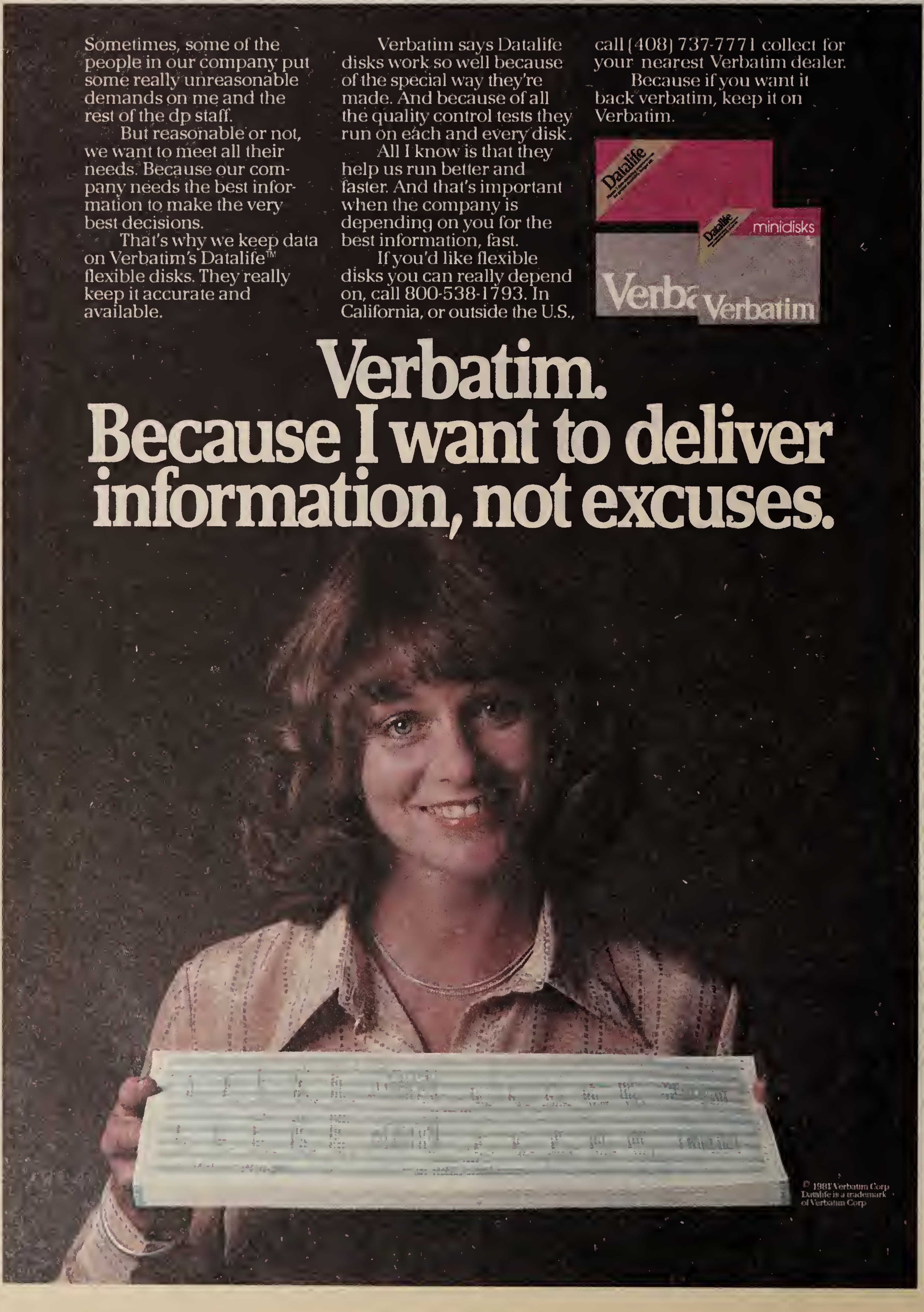
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All-Digital, Twisted Pairs

Ztel PBX: New Idea in an Old Factory

By **Bruce Hoard**
CW Staff

ANDOVER, Mass. — Some very new developments in communications technology are being wrought here in an old woolen mill now masquerading as the Andover Industrial Center.

Sprawling across the third floor of this monument to a different age is Ztel, Inc., a company started by four people who think they have the right idea at the right time. They are working on a revolutionary voice/data private branch exchange (PBX).

What makes it revolutionary, in part, is its reliance on all digital technology and conventional twisted-pair telephone wires. Beyond that, President Michael Lento claimed his firm is nearing completion of an innovative line access method that eliminates the snafus that have plagued its predecessors.

"Our concept is that a local area network really should provide voice and data capabilities in order to be really a true local area network," Lento said in an interview. "We're not prepared at this point in time to support coaxial-based systems since we're not sure of the technology and the user acceptance of them," he said.

With that thought as a beacon, Lento, Vice-President of Development Henry A. Zannini, Director of Software Development William Y. Tao and Director of Hardware Development Richard Epstein have moved forward on a device they hope will switch voice and data at speeds to 250M bit/sec while receiving and disbursing it over the twisted pair wiring at 56K bit/sec.

A traditional PBX receives a multitude of signals from a mainframe computer that monitors the system, Lento explained. Switching in such an arrangement is usually time division multiplexed or space division multiplexed.

In order to be a network, the Ztel system was designed in the scheme of a layered model and in a data communications network there are typically seven layers of software, he noted. The first two layers are the access layers and the top five establish call setup and the link with remote devices.

The Ztel software adheres to that model and the hardware is structured as a ring residing within a central cabinet, he said. The existing twisted-pair wiring is used to transport the voice and data signal to the switching mechanism over those wires and then back out on the network.

"It's sort of applying data communications network concepts to carry voice as well as traditional computer data," he explained. "And as such, the bandwidth is much higher than, for instance, a baseband Ethernet."

The company is developing its own line access method based on the "token passing" concept in which a packet or token containing destination and data is entered on the network. The Ztel method is a "hybrid" approach, Lento said.

It will involve a proprietary method of getting on and off the ring and maintain standards for the aforementioned top five software layers. Lento declined to discuss the method further.

Ztel networks will be able to span approximately a mile and will offer such amenities as electronic mail, X.25 gateways to the public packet-switched networks and eventually gateways to other Ztel networks, the president claimed.

Users will be able to set up their own protocols on the network so start/stop terminals of various speeds will be able to communicate. In the future, the network will also be able to perform protocol conversions, allowing unintelligent, asynchronous terminals to emulate more expensive synchronous terminals, he said.

"The whole concept of the network has to be that you certainly do not give up anything in the voice area, as people can install this as a replacement for their PBX," Lento said. "But you also have to

(Continued on Page 68)

Interface Controls Remote Hardware

ST. PAUL, Minn. — NWW Micro Systems, Inc. has announced an interface that enables users to remotely control processors and other hardware from a central site.

Called the NWW Serial Remote Control Interface (SRCI), the unit offers 10 control lines that allow users to operate remote hardware through modems or via direct RS-232 connection. The unit can operate on an Intel Series II or Series III microprocessor development system, the vendor said.

The unit can operate at 1,200 bit/sec over a standard telephone line and up to 9,600 bit/sec using a direct RS-232 connection.

The SRCI costs $1,295 or $1,695 with an integral modem. NWW Micro Systems can be reached through P.O. Box 43013, St. Paul, Minn. 55164.

Board Ties 16 Lines To PDP-11, VAX

SANTA ANA, Calif. — Emulex Corp. is offering a low-end single-board multiplexer for connection of 16 asynchronous communications lines to Digital Equipment Corp. PDP-11 and VAX-11 computers.

The CS21/H is functionally compatible with the DEC DH11 and is transparent to standard PDP-11 diagnostic and operating systems software.

With the Emulex VMS/UH software package, the CS21/HV version is compatible with VMS versions 2.0 and above and may be used on all current VAX-11 models.

The CS21/H multiplexer costs $4,100 from Emulex at 2001 E. Deere Ave., Santa Ana, Calif. 92705.

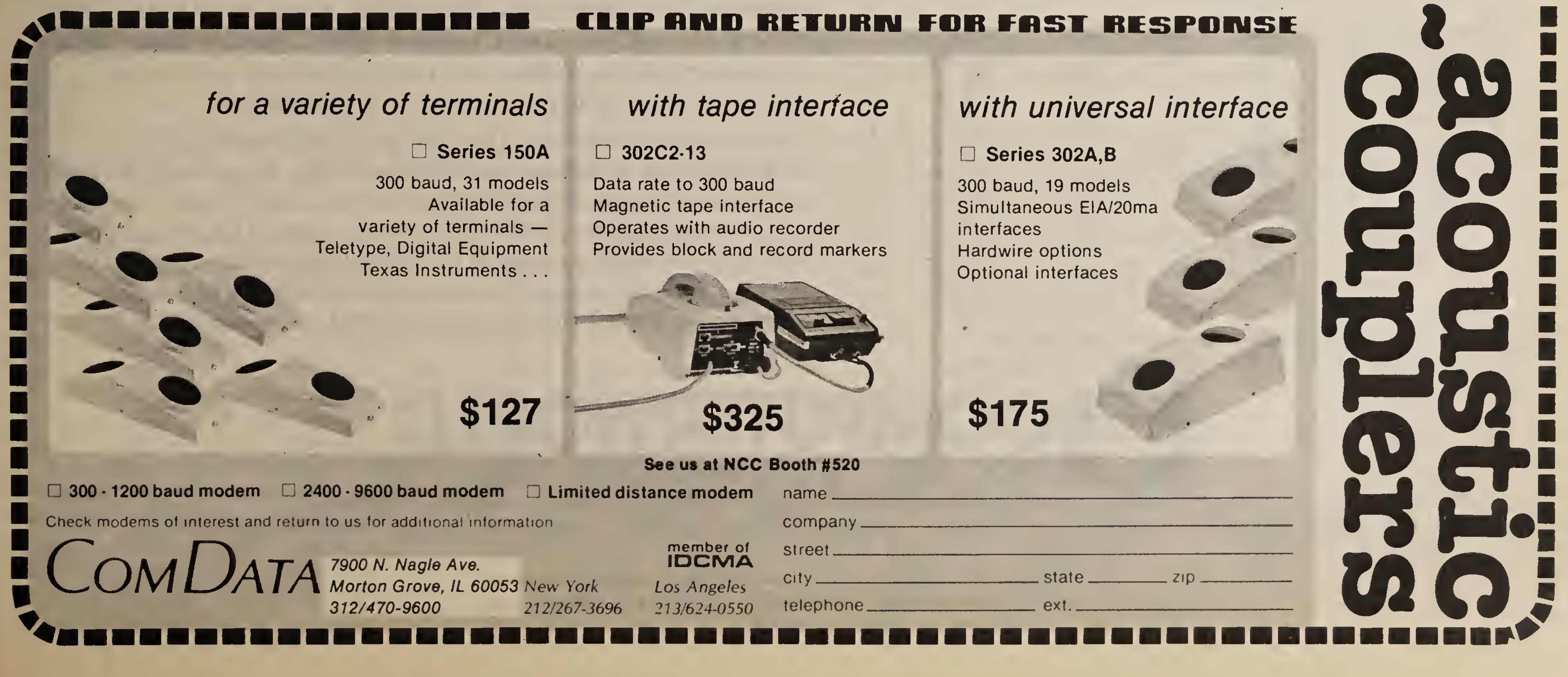
Developers Gain Emulation Tool

ROCKVILLE, Md. — A device that simulates the operating environment of DP systems serving large numbers of remote job entry and interactive terminals is available from Plessey Microsystems.

The Inquisitor is a remote terminal emulator that provides systems developers and testers with a tool to automatically test and evaluate the response time and throughput of real-time DP and communications systems.

It emulates terminal operation, user think time and user keystroke time according to a scripted operating scenario.

The price for Inquisitor is $100,000 for testing 16 lines, Plessey said from 451 Hungerford Drive, Rockville, Md. 20850.



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Philadelphia	WTAF	29	Tues	10:30 PM
Boston	WLVI	56	Sat	11:30 AM
Washington, DC	WDCA	20	Sat	12:00 Mid
Dallas/Ft. Worth	KNBN	33	Sat & Tues	12:30 PM & 7:30 AM
Detroit	WXON	20	Sat	10:00 AM
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Via Hyperchannel

'Unet' Boosts DEC, CDC Transmission

MOUNTAIN VIEW, Calif. — 3Com Corp. has enhanced its Unet software to extend communications rates up to 100K bit/sec for Digital Equipment Corp. computers and up to 200K bit/sec for Control Data Corp.'s Cyber series via the high-speed Hyperchannel from Network Systems Corp.

Along with the networking software enhancement, 3Com has adopted a flexible pricing and licensing schedule, a spokesman said. It consists of a two-part fee structure; one for program licensing and another for binary copies of the program, he said. The program license fee is for use of Unet source code and one binary copy and the binary copy fee covers the use of additional code.

As the program license fee increases, the binary copy fee is progressively discounted. "Our objective was to price Unet so that our customers could choose the binary discount level that best fits their projected usage and cash flow preferences," Lawrence Hartge, vice-president of marketing, explained.

Pricing examples begin with a program license fee of $7,500 tied to a binary copy fee of $4,000 to a program license fee of $150,000 with no cost tied to additional binary copies. 3Com is located at 1390 Shorebird Way, Mountain View, Calif. 94043.

Modem Serves Private Nets

SUNNYVALE, Calif. — A modem for international communications and private network users with two-wire, full-duplex capability is available from Prentice Corp.

The P-V.22 features data rates of 1,200 and 600 bit/sec in the synchronous mode while 1,200, 600 and 0- to 300 bit/sec rates are possible in the asynchronous mode, the vendor said.

The 600 bit/sec rate is available primarily as a fallback capability to enable accurate transmission.

The modem costs $712 from Prentice at 266 Caspian Drive, Sunnyvale, Calif. 94086.

Beehive Terminal Features Editing, Formatting Capabilities

SALT LAKE CITY, Utah — Beehive International, Inc. has unveiled a CRT terminal with editing and formatting capabilities and switch-selectable RS-232/RS-422 communications interfaces.

The DM5B Terminal

The DM5B is a buffered terminal addressing both interactive and batch mode markets. It finds applications where data transmission can be selectively designed as conversational line, message and page. The forms mode allows the operator to prepare a form with specific visual and logical attributes on the display screen and then transmit it to a host computer or auxiliary device.

The unit is priced at $1,295. Beehive is at 4910 Amelia Earhart Drive, Box 25668, Salt Lake City, Utah 84125.

Bus Card Runs To 30K Bit/Sec

BELTSVILLE, Md. — A bus controller card providing a means for Multibus system communications among IEEE-compatible instruments and peripherals at a transfer rate of 0- to 30K bit/sec is available from Information Development & Applications, Inc.

The Ideas HS-488 package provides a software driver sample with each bus. The driver subroutine (8080 assembly language) provides simple commands including service addressing, sending and receiving data and directing other devices, the vendor said.

Available Options

Isis or CP/M-compatible disks are available options. The package is compatible with Intel Corp.'s multibus standard and IEEE-796, the vendor said.

The on-board Intel 8291 and 8292 Qpib microcircuits are directly addressable with computer I/O instructions with flexible interrupt control provisions, according to the vendor.

Ideas HS-488 costs $895. More information is available from Information Development & Applications, Deptartment 488, 10811 Tucker St., Beltsville, Md. 20705.

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Modem Subs For Bell 202

SEATTLE — A 1,200 bit/sec Bell 202-compatible stand-alone direct-connect modem that can be used asynchronously or synchronously by any device using a standard RS-232C interface is available from International Entry Systems, Inc. (IESI).

The Datacorder provides a synchronous clock for those devices requiring it. Pins 15 and 17 are active as transmitter and receiver clock, respectively. In addition, the modem also has the ability to autodial the phone.

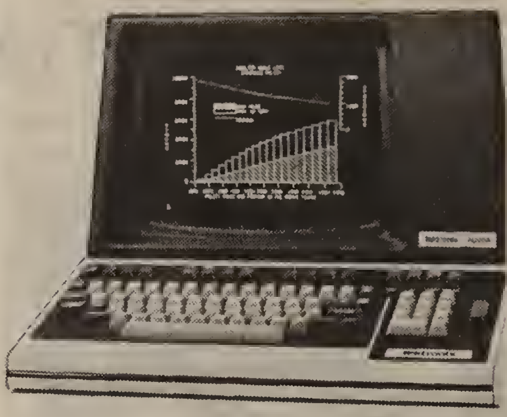
The unit costs $575, IESI said from 408 N.E. 72nd St., Seattle, Wash. 98115.

Textronix 4020 Gets Graphics, Color Features

BEAVERTON, Ore. — Tektronix, Inc. has introduced two CRT terminals featuring text handling, graphics and color capabilities.

The two terminals make up the 4020A series, an enhanced line of Tektronix's 4020 series.

The 4025A and 4027A terminals handle data communications, with flagging, at speeds of up to 9,600 bit/sec. The 4025A has a 16K-byte display memory base while the 4027A features a 48K-byte base of graphics memory in addition to the 16K-byte base.



The Tektronix 4025A Unit

Increased local graphics throughput capability in the 4025A includes the addition of up to 16 macro commands plus locally defined circles, arcs and clipping firmware.

The 4025A costs $5,200 and the 4027A is priced at $10,000.

Tektronix can be reached at P.O. Box 500, Beaverton, Ore. 97077.

Ztel Working On New PBX

(Continued from Page 59)

provide them with the data networking features to convince them to put data onto the same network."

The company was officially incorporated this February, after its four principal officers defected from Cambridge Telecommunications, Inc. The funding for it came from the Fairfield, Conn., venture capital firm of Adler & Co. Lento declined to divulge his original nest egg.

After doing their own market analysis, the four decided the local communications area was wide open and time wise, "windows seemed to be right," as the president put it. In other words, by the time Ztel is ready to sell its product sometime around the beginning of 1983, an apprehensive public will hopefully be over its first generation PBX jitters and ready to buy.

A quick look around the capacious premises reveals what at least part of the money has bought. Some 20 employees, 15 of whom are top-flight engineers or computer people, can be seen at various tasks, including busily bringing a new computer-aided design and computer-aided manufacturing system on-line. Ztel will use the system to design its own printed circuit boards.

Close by, other workers are tending to the Digital Equipment Corp. PDP-11/70, which is used for, among other things, in-house software development.

Everybody seems happy, a state of mind Lento likes to foster. "We set very, very aggressive goals," he said. "And if you can't keep your sensitivity to people's need for fun, they can't do their work and you're not going to meet those goals or keep your sanity."

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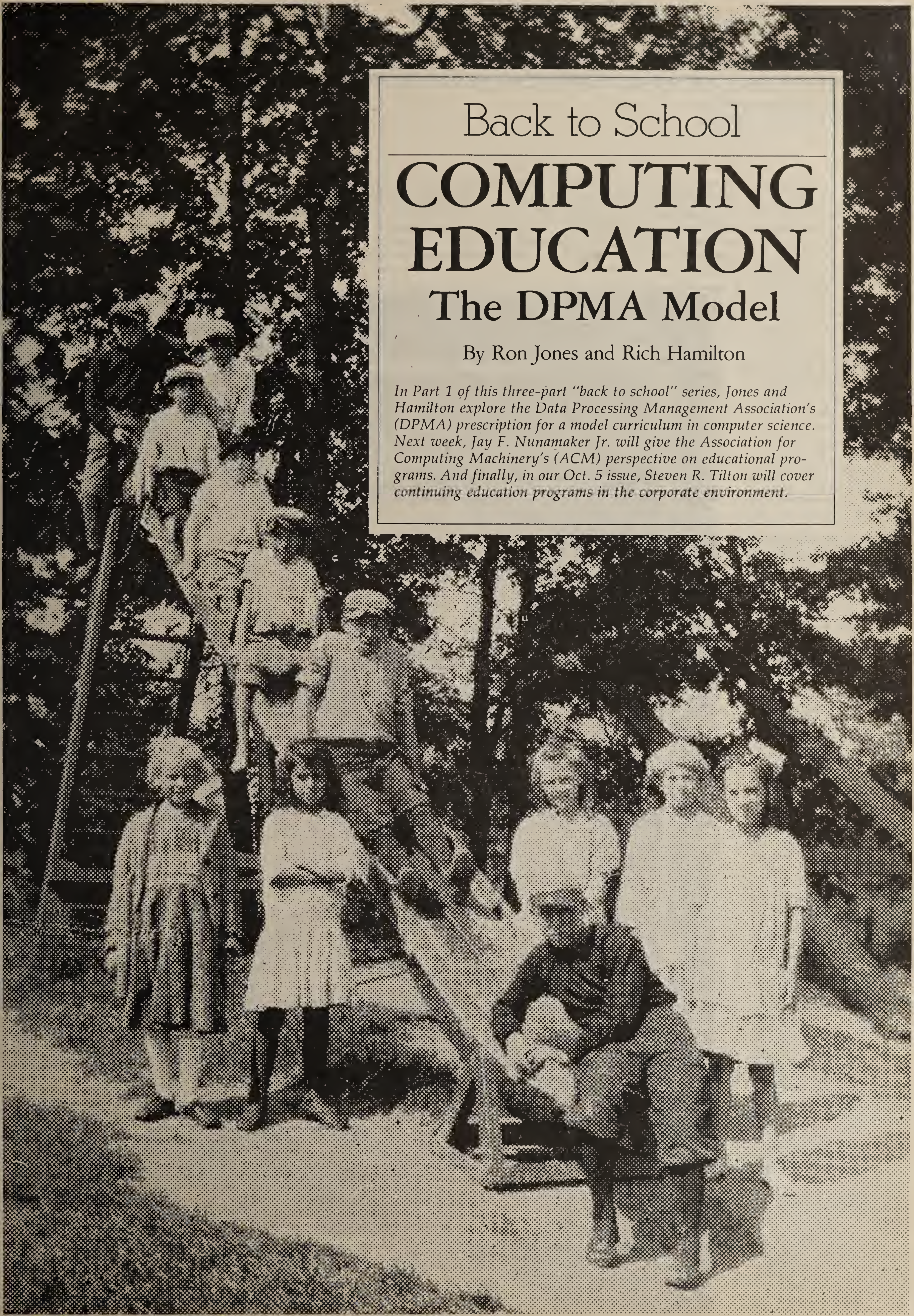
Back to School

COMPUTING EDUCATION

The DPMA Model

By Ron Jones and Rich Hamilton

In Part 1 of this three-part "back to school" series, Jones and Hamilton explore the Data Processing Management Association's (DPMA) prescription for a model curriculum in computer science. Next week, Jay F. Nunamaker Jr. will give the Association for Computing Machinery's (ACM) perspective on educational programs. And finally, in our Oct. 5 issue, Steven R. Tilton will cover continuing education programs in the corporate environment.



The data processing or information systems manager needs to understand the past, present and future of computing education in order to more accurately judge the growth potential of existing employees, to more accurately specify the qualifications required of new entry-level employees and in order to make better long-range plans in the light of future manpower availability. By "computing education" we mean the educational experiences that are gained in classrooms at the college or university level and that serve to prepare one to work in data processing or information systems. For the most part, high schools and proprietary schools are excluded.

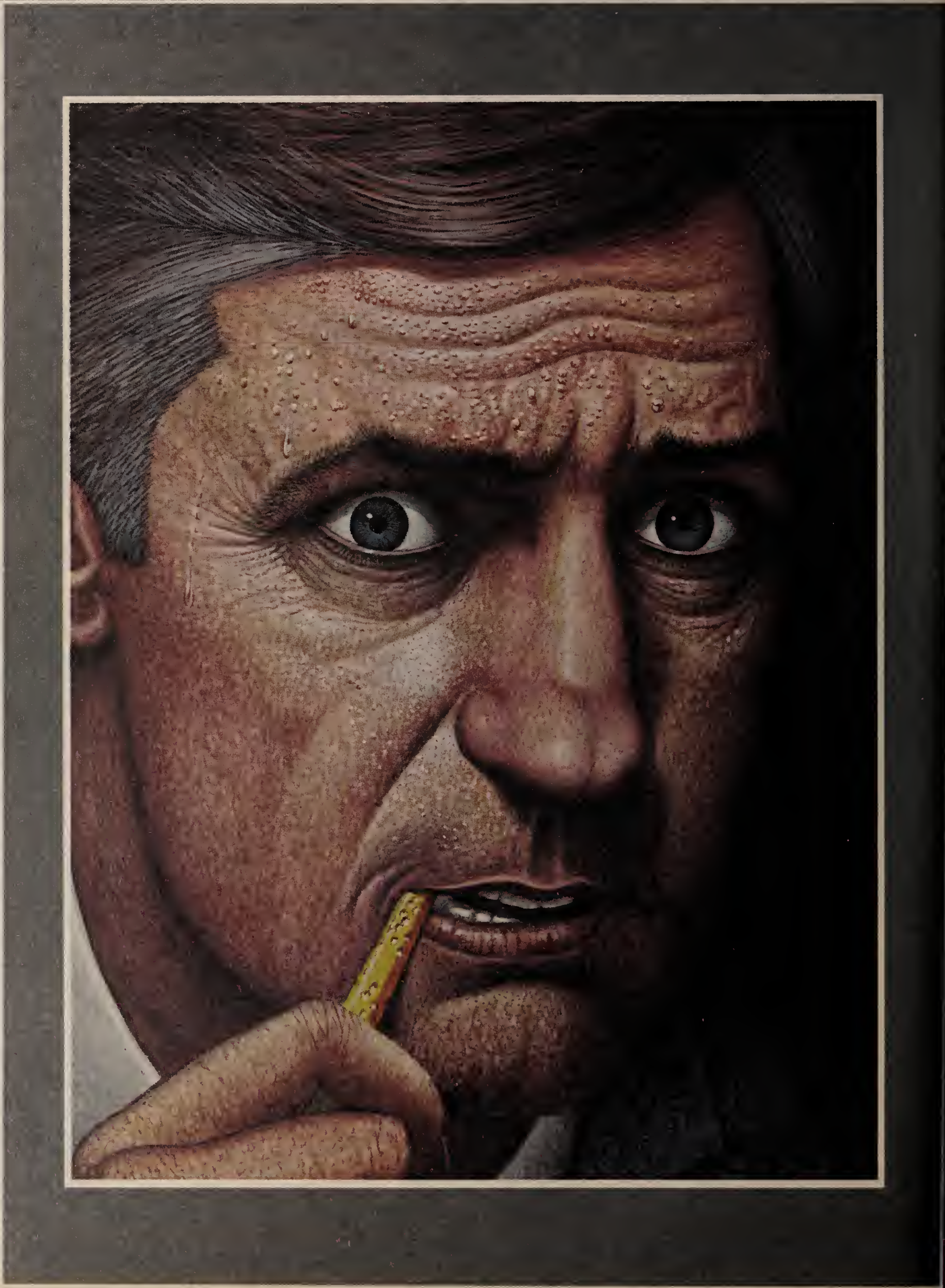
The following description of computing education past deals with the proliferation of educational programs and the managerial assessment of them. The section on the present describes the Data Processing Management Association's (DPMA) current prescription for computing education, the computer information systems model curriculum and contrasts it with prevailing educational programs. Finally, the section on the future looks at prospects for successful implementation of the DPMA curriculum.

The Past

John Hamblen is one of the more knowledgeable persons on the past of computing education, having researched the subject of computers in higher education and surveyed users on computer manpower supply and demand yearly from 1964 to date.[1] He remarked that "the cause of many of the problems associated with computer usage is the 'overutilization of undereducated people' . . . The reason being, of course, that properly educated people have not been available. Bootstrapping by training existing personnel and pirating whatever others centers had trained was the only way that staff could be obtained during the late '50s and early '60s. The late '60s saw the tremendous growth in the one- and two-year [educational] programs aided by large infusions of federal monies . . . The '70s might well become known as the decade of the recognition of the value of the college graduate to effective and efficient computer usage."[2]

The growth of higher educational programs in computing was not orderly or standardized. Although the public may have seen them simply as "computer courses," the degree programs emerged under a variety of names and from a diversity of academic disciplines. Hamblen and Nunamaker list between them 22 frequently used titles for educational programs in computing.[3] These are shown in Table 1. This list does not comprise the total; there are other less frequently used titles and titles that have come into use more recently, such as "computer-based information systems" and "software engineering."

A further complexity arises from the academic disciplines or departments administering the degree programs. Hamblen lists 15 names of disciplines or de-



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partments not duplicating those already given as degree titles.[4] These are shown in Table 2. Thus, the manager studying the past of computing education would be confronted with degrees such as systems analysis, electronic data processing or computer science from departments as diverse as business administration, mathematics and education. The proliferation of academic programs has almost rivaled the proliferation of computer languages.[5]

The educational picture seemingly can be simplified by considering the numbers of students graduated by the various degree programs. Table 3 contains the top seven programs, which account for 79% of the graduates of 1976-77. The bachelor's degree in computer science and the associate degree in data processing jointly account for more than half of the graduates. Only four degree titles are required to account for 81% of the graduates: computer science (43%), data processing (28%), computer programming (5%) and information systems (5%).[6]

The simplification achieved

(Continued on In Depth/16)

What Is The DPMA?

The Data Processing Management Association (DPMA) is the largest organization serving the information and computer management community. Organized in 1951, the association engages in education and research activities focused on the development of effective programs for the self-improvement of its membership.

DPMA became a member of the American Federation of Information Processing Societies in 1974. In 1975 it created the DPMA Education Foundation to expand educational opportunities for information processing professionals.

Among the association's "firsts" is the establishment of the Certificate in Data Processing (CDP). The certification program is intended to establish high standards based on a broad educational framework and practical knowledge.

DPMA publications include *Data Management*, a monthly that offers articles on management and technical subjects for DPMA members; and *Compu-Fax*, a bimonthly for top corporate management that summarizes news, developments and trends in information processing.

Regular membership is granted by the board of directors at each local chapter. Membership is open to: (1.) managerial or supervisory personnel in data processing installations; (2.) systems and methods analysts, research specialists and programmers engaged in administrative, executive or consulting capacities; (3.) managers, educators and executive personnel with a direct interest in data processing; (4.) and holders of the CDP.

Further information on DPMA activities is available from DPMA headquarters, 505 Busse Highway, Park Ridge, Ill. 60068.

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FREQUENTLY USED TITLES OF EDUCATIONAL PROGRAMS IN COMPUTING

- Business Data Processing
- Business Information Systems
- Computer Engineering
- Computer Information Science
- Computer Information Systems
- Computer Programming
- Computer Science
- Computer Science and Engineering
- Computer Technology
- Data Processing
- Electronic Data Processing
- Information and Computer Sciences
- Information Processing
- Information Science
- Information Systems
- Information Systems Analysis and Design
- Management Information Systems
- Management Systems
- Systems Analysis
- Systems Engineering
- Systems and Information Sciences
- Systems Sciences

Table 1

(Continued from In Depth/5)

by considering volume of output is illusory, however, in that there is little standardization and no accreditation at work in computing education — at least in the top-ranked degree titles. Thus, prospective employees with computer science degrees, for instance, might differ considerably in the variety and quality of their educational experiences. Knowledge of the degree title does not convey much predictive accuracy about applicant qualifications. Not only is there considerable variation in curriculum among degree programs, but there may also be considerable variation in faculty qualifications, computer facilities and library resources.[7]

Computer science has become to the public the generic term for computing education, and corporate recruiters have tended to specify "computer science" as a requirement for employment. Alfs Berztiss commented, "Universities have responded to this need, but in a rather haphazard manner, with the result that we have today a variety of programs, some of which have very little to do with computer science. Some of the graduate programs are no more than . . . 'undergraduate programs for grown-ups.' "[8]

Berztiss continued his discussion of graduate programs in computer science by calling for the establishment of accreditation guidelines. "There already exist M.S. programs supposedly in computer science that have inadequate prerequisites and are understaffed, and there is the incentive to start new programs. However good may be the initial intentions for the new program, it is bound to fail for lack of qualified faculty (unless the program is a new sideline in an already established department) . . . An accreditation mechanism might discourage the creation of substandard programs."[9]

Accreditation, with its concomitant standardization and quality assurance programs, has not yet arrived in computing education. There have been well-publicized model curricula for computer science, but the majority of computer science degree programs probably are not in conformance with the model curricula. Model curriculum efforts for community colleges and for university-

FREQUENTLY USED NAMES OF DEPARTMENTS AND DISCIPLINES OFFERING COMPUTER DEGREES, EXCLUDING THOSE IN TABLE 1

- Business Administration
- Business Commerce
- Computer and Communication Sciences
- Education
- Electrical Engineering
- Electrical Engineering Technology
- Engineering
- Environmental Sciences
- Industrial Engineering
- Life Sciences
- Mathematics
- Physical Sciences
- Social Sciences
- Statistics and Computer Science

Table 2

COMPUTING DEGREE PROGRAMS RANKED BY NUMBER OF GRADUATES IN 1976-77

Academic Level	Degree Title	Rank	Number of Graduates	Percent Of Total	Cumulative Percent
Bachelor's	Computer Science	1	3,417	28%	28%
Associate	Data Processing	2	3,058	25%	53%
Graduate	Computer Science	3	1,221	10%	63%
Associate	Computer Science	4	663	5%	68%
Associate	Computer Programming	5	591	5%	73%
Bachelor's	Information Systems	6	390	3%	76%
Bachelor's	Data Processing	7	380	3%	79%

Table 3

level information systems programs have been less successful. For example, Nunamaker reported that information systems programs "vary tremendously from university to university."[10]

The Present

There is at present an increased level of dissatisfaction with collegiate computer education and computer science. A recent study concluded, "There has been a change in the nature of DP recruiting. While over one-third of all respondents (in the insurance industry) make special efforts to attract computer science majors, there is a significant reduction in their performance evaluations after one year on the job when compared with recruits from other sources. Computer science majors display only slightly better language familiarity and often have low understanding of business data processing and systems design. Dissatisfaction is particularly evident among larger companies, which are increasingly looking to agencies and internal transfers — and away from colleges — for new employees."[11]

Another indication of dissatisfaction with computer science can be found in a survey one of us made in 1980, which asked data processing managers within 75 miles of Kansas City, Mo., to indicate their preference for a computing education.[12] The respondents were offered a choice among traditional degrees with a computer science major offered by business, arts, engineering or education *and* computer science degrees offered by these same academic units. The traditional degrees bested the computer science degrees in every instance.

The first choice, with 50.9% of the vote, was for a bachelor of business administration degree with a major

(Continued on In Depth/8)

KANSAS CITY AREA MANAGERS' PREFERENCE FOR COMPUTING EDUCATION

Degree Advised	Percent Of Responses
Bachelor of Business Administration with a major or concentration in Computer Science	50.9
Bachelor of Computer Science (degree granted by College of Business)	20.6
Bachelor of Arts with a major or concentration in Computer Science	6.3
Bachelor of Computer Science (degree granted by College of Arts & Sciences)	3.4
Bachelor of Engineering with a major or concentration in Computer Science	4.6
Bachelor of Computer Science (degree granted by College of Engineering)	4.0
Bachelor of Education with a major or concentration in Computer Science	0.6
Bachelor of Computer Science (degree granted by College of Education)	0.6
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REQUIRED CIS CORE COURSES[1]

CIS-1	INTRODUCTION TO COMPUTER-BASED SYSTEMS. An introduction to computers and data processing taught as a general education course for all students (lower division).
CIS-2	APPLICATIONS PROGRAM DEVELOPMENT I. A beginning computer problem solving and programming course using Cobol as the vehicle language (lower division).
CIS-3	APPLICATIONS PROGRAM DEVELOPMENT An advanced computer problem solving and programming course using Cobol (lower division).
CIS-4	SYSTEMS ANALYSIS METHODS. An overview of the systems development life cycle with emphasis on techniques and tools of system documentation and logical system specification (lower division).
CIS-5	STRUCTURED SYSTEMS ANALYSIS AND DESIGN. Advanced coverage of the strategies and techniques of structured systems development (upper division).
CIS-6	DATA BASE PROGRAM DEVELOPMENT. A course emphasizing software design and programming in a data base environment (upper division).
CIS-7	APPLIED SOFTWARE DEVELOPMENT PROJECT. A capstone systems course integrating the knowledge and abilities gained through the other computer-related courses in the curriculum within a comprehensive system development project (upper division).

[1] Lower division is freshman/sophomore level; upper division is junior/senior level.

Table 5

CIS ELECTIVE COURSES

CIS-8	SOFTWARE AND HARDWARE CONCEPTS. A survey of technical topics related to computer systems with emphasis on the relationships between hardware architecture, systems software and applications software.
CIS-9	OFFICE AUTOMATION. An examination of the office as a center of business activity, operational logistics, and decision support and the impact of automation on the office environment.
CIS-10	DECISION SUPPORT SYSTEMS. An analysis of the highest level of information support systems which aid the manager in the decision-making process.
CIS-11	ADVANCED DATA BASE CONCEPTS. An in-depth investigation of data modeling, system development and data administration in a data base environment.
CIS-12	DISTRIBUTED DATA PROCESSING. An examination of the features and impact of distributed systems in the business enterprise.
CIS-13	EDP AUDIT AND CONTROLS. An introduction to EDP auditing with emphasis on EDP controls, audit types and audit techniques and their effects on system development.
CIS-14	INFORMATION SYSTEMS PLANNING. An introduction to the financial, technical and strategic information systems planning process.
CIS-15	INFORMATION RESOURCE MANAGEMENT. A seminar in information systems management with emphasis on planning, organizing and controlling user services and managing the systems development process.

[1] All are upper division, junior/senior level.

Table 6

(Continued from In Depth/7)

or concentration in computer science. The second choice, with 20.6%, was for a bachelor of computer science degree granted by a college of business. Table 4 presents the results.

Dissatisfaction with past computing education has been made very explicit by the DPMA in its creation of a model curriculum in "computer information systems." Looking beyond possible problems of educational quality, the DPMA position is, "Separate but real, business DP is different from computer science."[13] The DPMA position, as recently expounded by David R. Adams, editor of the DPMA Executive Committee on Model Curriculum Development, is that computer science is a good preparation for the development of high-technology software, for example, operating systems and data management software, but a poor preparation for business-oriented, computer-based systems.[14]

The DPMA CIS model curriculum is intended to produce entry-level applications programmer/analysts with the educational background and desire for lifelong professional development. The CIS model curriculum is composed of seven required CIS core courses, three other CIS courses to be chosen from a set of eight recommended elective courses, plus a required set of business support courses. Descriptions of these courses are given in Tables 5, 6 and 7. The figure on In Depth/10 shows the prerequisite structure of the curriculum. The CIS degree is to be a four-year bachelor's degree and thus additional general education and business courses would be taken to bring the total number of course hours to 120.

The unique contribution of the CIS curriculum can best be seen in comparison with the model undergraduate computer science curriculum promulgated by the Computer Science Education Group of the Association for Computing Machinery.[15] The various courses given in the computer science curriculum are shown in Table 8. The ACM/CS curriculum was adopted in 1978 and is the latest official formulation.

The two curricula overlap considerably in course topics, although depth and rigor of treatment might vary a good deal between the two. The overlap is approximately half of each curriculum: 58%, or 22 courses, for computer science and 43%, or 10 courses, for computer information systems. The overlap covers areas of programming, computer organization, file processing, data structures, data base management systems, decision support systems, computer systems, distributed systems and teleprocessing, statistics and linear algebra.

Core differences between the two are that computer information systems includes systems analysis and design, while computer science does not include them at any point, and computer science includes organization of programming languages, while computer information systems omits that topic entirely. The differences in core topics are smallest: only 13% of the computer science core topics are unique to computer science and only 29% of the computer information systems core topics are unique to computer information systems. Table 9 lists the courses that are unique to either curriculum.

Differences are greater in the elective or special topics courses. Topics unique to computer science include artificial intelligence, graphics and the more abstract and mathematical studies. Topics unique to computer information systems include office automation, EDP auditing and information systems.

The two curricula differ most in their support courses. Computer science includes four mathematics courses whose topics are not duplicated in computer information systems. Seven business support courses are required by computer informa-

REQUIRED BUSINESS SUPPORT COURSES

BUS-1	FINANCIAL ACCOUNTING PRINCIPLES. Coverage of the accounting cycle and the preparation of primary financial statements.
BUS-2	MANAGERIAL ACCOUNTING PRINCIPLES. Accounting concepts for internal use of management in planning and control of operations.
BUS-3	QUANTITATIVE METHODS. Application of quantitative approaches and techniques to solving decision problems.
BUS-4	PRINCIPLES OF MANAGEMENT. Basic concepts of systems, decision making, organizational evolution and interpersonal considerations within organizations, and the planning, organizing, staffing and control activities of managers.
BUS-5	PRINCIPLES OF MARKETING. Study of flow of goods from producer to consumer — the demand-stimulated and demand-fulfilling activities of business enterprises.
BUS-6	PRINCIPLES OF FINANCE. Study of the demand for funds and supply of funds by business, consumers, government and foreign sectors, financial institutions, instruments and policies.
BUS-7	ORGANIZATIONAL BEHAVIOR. Human aspects of organizations; individual and interpersonal behavior and group processes and their effects on the organization.
BUS-8	PRODUCTION AND OPERATIONS MANAGEMENT. Concepts underlying effective operating control of manufacturing and service businesses; approaches to production control, inventory policy, facilities planning, methods improvement and technological assessment.

Table 7

COMPUTER SCIENCE MODEL CURRICULUM

Core Courses:

Course	Title
CS 1.	Computer Programming I
CS 2.	Computer Programming II
CS 3.	Introduction to Computer Systems
CS 4.	Introduction to Computer Organization
CS 5.	Introduction to File Processing
CS 6.	Operating Systems and Computer Architecture I
CS 7.	Data Structures and Algorithm Analysis
CS 8.	Organization of Programming Languages

Elective Courses:

Course	Title
CS 9.	Computers and Society
CS 10.	Operating Systems and Computer Architecture II
CS 11.	Data Base Management Systems Design
CS 12.	Artificial Intelligence
CS 13.	Algorithms
CS 14.	Software Design and Development
CS 15.	Theory of Programming Languages
CS 16.	Automata, Computability and Formal Languages
CS 17.	Numerical Mathematics: Analysis
CS 18.	Numerical Mathematics: Linear Algebra

Special Topics Courses:

Course	Title
A.	Microcomputer Laboratory
B.	Minicomputer Laboratory
C.	Performance Evaluation
D.	Telecommunications/Networks/Distributed Systems
E.	Systems Simulation
F.	Advanced Systems Programming
G.	Graphics
H.	Compiler Writing Laboratory
I.	Structured Programming
J.	Topics in Automata Theory
K.	Topics in Compatibility
L.	Topics in Formal Language Theory
M.	Simulation and Modeling

Mathematics Requirements:

Course	Title
MA 1.	Introductory Calculus
MA 2.	Mathematical Analysis I
MA 2A.	Probability
MA 3.	Linear Algebra
MA 4.	Discrete Structures
MA 5.	Mathematical Analysis II
MA 6.	Probability and Statistics

Table 8

tion systems.

In summary, it might be said that CIS includes most of the fundamental computer science topics, but excludes the more abstract and mathematical topics, while including systems and business topics. Because of the extensive overlap between the two curricula, CIS might be termed "applied computer science." Those topics of computer science of little value in the application of computing to business have been excluded and topics deemed of considerable importance in application have been included.

The man perhaps most responsible for the DPMA/CIScurriculum is Tom Athey, chairman of the Information Systems Department, California State Polytechnic Institute, Pomona. His organization sponsored the initial meeting in 1979 of educators from universities, community colleges and proprietary schools to establish business data processing as a separate but viable education field.

A second national conference/workshop attended by computer educators and industry representatives was held in January 1980. Following this conference, a DPMA Executive Committee was formed to oversee the project. Athey is the chairman. Other members include David R. Adams (Northern Kentucky University), Donald E. Price (Sierra Community College), Gerald Wagner (California Polytechnic Institute, Pomona), Charles F. Durang (Winthrop Publishers, Inc.) and James Stallard (General Dynamics Corp.).

Following adoption of the curriculum as a project by DPMA's Educational Foundation, five regional conferences were held between October 1980 and April 1981. Questionnaires were used to elicit revisions needed to the evolving curriculum. Teams were appointed to refine and develop in depth each course description. A draft of the curriculum report was presented at the National Computer Conference last May.

New Emphasis

Don Price, Executive Committee member and president of the DPMA Educational Foundation, said the model curriculum marks the beginning of a DPMA emphasis on education. Thousands of copies of the final report for the curriculum are being printed. Approximately 1,000 people who were associated with the development of the curriculum will receive a copy of the report. A brochure will be mailed to every university and college in the U.S. and Canada, inviting them to request a free copy of the 60- to 70-page final report. A national education symposium will be held on March 22-24 in Chicago and will feature workshops on the content and teaching of the courses. Further, Price said, the 1982 DPMA conference will have a special track for educators, and the National Education Symposium will be an annual spring event.

The model curriculum is intended as a "living document," Price said, and will be revised as needed. DPMA headquarters will have a person assigned to the project and the executive committee will remain active. "We won't wait 10 years to revise the curriculum," Price commented.

The Future

Adoption of the CIS curriculum by the DPMA would seem to signal that it will prove acceptable to employers as the educational basis for entry-level programmer/analysts. Questions remaining for future answers include the acceptance of the curriculum by students and educators.

It remains to be seen whether "computer information systems" will be recognized by the school-going public as a desirable degree. Computer science has become almost the generic term for computing education to the public and brand loyalty may hold despite the representations by employers that CIS is the degree they prefer.

The title "applied computer science" would probably be more descriptive to most of the public than "computer information systems." However, in many cases, the business schools that might wish to start an applied computer science program would be prohibited from doing so by prior award of the computer science "franchise" to a mathematically oriented department with little interest in or capability for the business-oriented computer information systems curriculum.

Consumer brand loyalty may be the key. The contest between the M.D.'s and the D.O.'s in the medical field may be repeated in computing, with computer science playing the M.D.

(Continued on In Depth/10)

COMPARISON OF COURSES UNIQUE TO EITHER COMPUTER SCIENCE OR COMPUTER INFORMATION SYSTEMS

	UNIQUE COMPUTER SCIENCE		UNIQUE COMPUTER INFORMATION SYSTEMS
CORE			
CS 8	Organization of Programming Languages	CIS 4	Systems Analysis Methods
		CIS 5	Structured Systems Analysis and Design
ELECTIVE AND SPECIAL TOPICS			
CS 12	Artificial Intelligence	CIS 9	Office Automation
CS 13	Algorithms	CIS 13	EDP Audit and Controls
CS 15	Theory of Programming Languages	CIS 14	Information Systems Planning
CS 16	Automata, Computability, and Formal Languages	CIS 15	Information Resource Management
CS 17	Numerical Mathematics: Analysis		
CS 18	Numerical Mathematics: Linear Algebra		
ST G	Graphics		
ST H	Compiler Writing		
ST J	Automata Theory		
ST K	Computability		
ST L	Formal Language Theory		
SUPPORT			
MA 1	Introductory Calculus	BUS 1	Financial Accounting Principles
MA 2	Mathematical Analysis I	BUS 2	Managerial Accounting Principles
MA 4	Discrete Structures	BUS 4	Principles of Management
MA 5	Mathematical Analysis II	BUS 5	Principles of Marketing
		BUS 6	Principles of Finance
		BUS 7	Organizational Behavior
		BUS 8	Production and Operations Management

Table 9

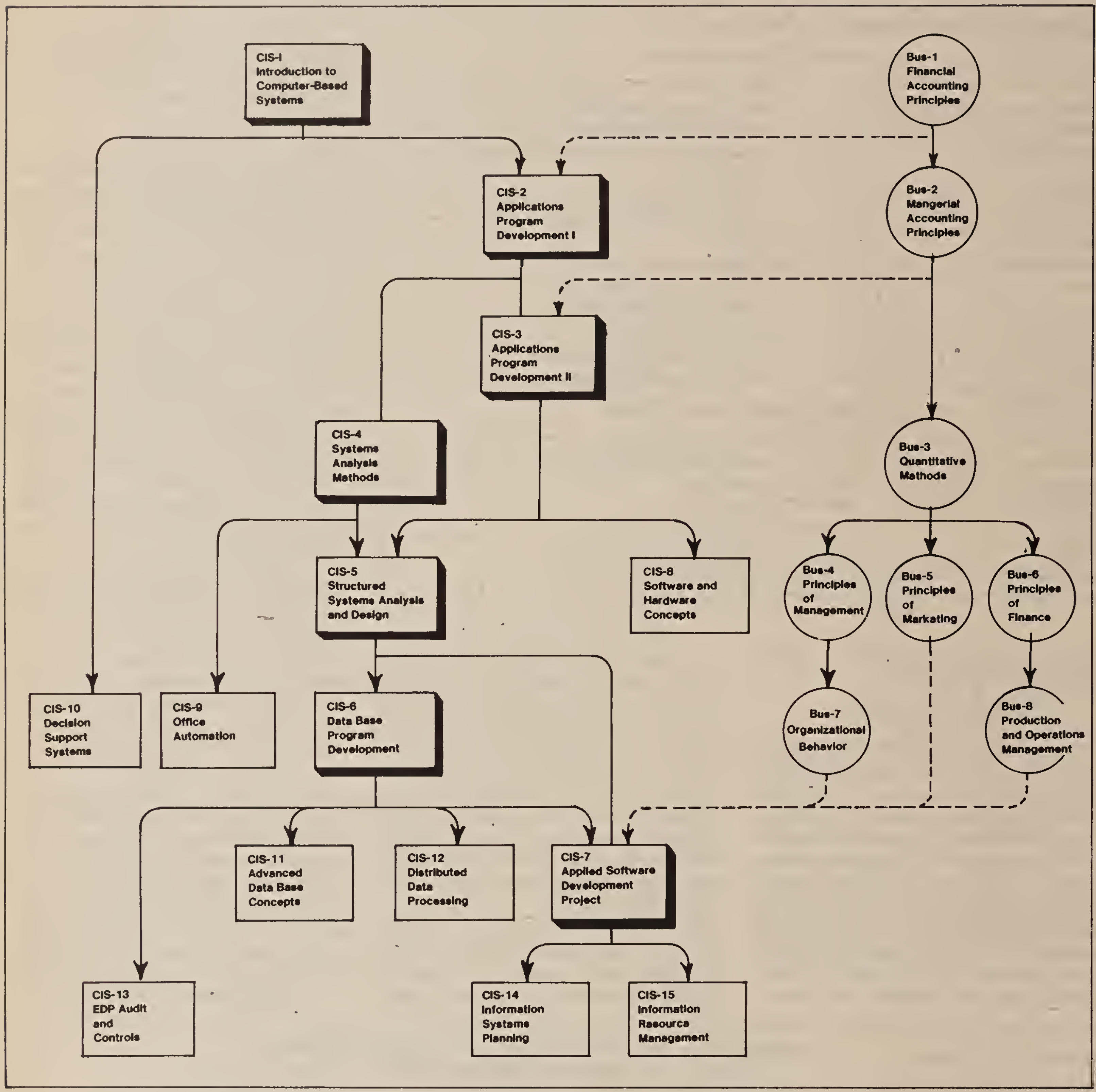
CIS-I Introduction to Computer-Based Systems
Bus-1 Financial Accounting Principles
CIS-2 Applications Program Development I
Bus-2 Mangerial Accounting Principles
CIS-3 Applications Program Development II
CIS-4 Systems Analysis Methods
Bus-3 Quantitative Methods
CIS-5 Structured Systems Analysis and Design
CIS-8 Software and Hardware Concepts
Bus-4 Principles of Management
Bus-5 Principles of Marketing
Bus-6 Principles of Finance
CIS-10 Decision Support Systems
CIS-9 Office Automation
CIS-6 Data Base Program Development
Bus-7 Organizational Behavior
Bus-8 Production and Operations Management
CIS-11 Advanced Data Base Concepts
CIS-12 Distributed Data Processing
CIS-7 Applied Software Development Project
CIS-13 EDP Audit and Controls
CIS-14 Information Systems Planning
CIS-15 Information Resource Management

Figure 1

and computer information systems playing the D.O.

The question of acceptance by educators is also crucial. The educators most in question are the business school faculties, because of the business support courses required by the CIS curriculum. Terry Boyer, regent of the DPMA Education Foundation, has been in contact with the business school accrediting agency, the American Assembly of Collegiate Schools of Business (AACSB), to ascertain the acceptability of the CIS curriculum. It is hoped that the curriculum can be an accredited business degree program.

The AACSB has said that it does not rule in general on model curricula, but certifies individual degree programs in the context not only of courses, but also of student admission standards, faculty qualifications, library and computer support and so on. Thus, the acceptability of the curriculum awaits the first test case by a specific university in applying for accreditation. Boyer and Price say they know of 15 to 20 business schools now considering the adoption of a computer information systems degree program.

Another problem confronting the business school wanting to adopt the degree is lack of qualified faculty. The AACSB, which requires a substantial number of doctoral faculty for an accredited program, has expressed a willingness to accept "retreads" from allied doctoral programs as qualified faculty. Boyer remarked that the education foundation has been looking at the problem of "retooling" university professors and has explored the possibility of acquiring grants, through the foundation, for retooling professors and fully qualifying them for the computer information systems curriculum.

However, there are factors mitigating against a business school location. Business schools are already strained to capacity by a combination of increased enrollments and lowered resources. This strain has been operating for more than a decade. The '70s were times of increased enrollments in business and times when inflation eroded the resources available. Lowered enrollments in other university areas meant that business schools, with their higher enrollments, had to bear a larger share of the burden of overall university support. It is not certain that the business schools will have the desire or ability to host computer information systems programs.

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FOOTNOTES

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About the Author

Dr. Ron Jones is professor of computer science at the University of Missouri-Kansas City's School of Administration. He has been in data processing for 20 years and is a member of DPMA and ACM.

Dr. Rich Hamilton is professor of marketing at the University of Missouri-Kansas City's School of Administration. Prior to his graduate education, Hamilton worked as a Cobol programmer and systems analyst for Marathon Oil.

STRUCTURED MAINTENANCE

THE WARNIER/ORR WAY

Jean-Dominique Warnier

By Girish Parikh

Software maintenance consumes two-thirds (67%) of a life cycle; only 32% is development. Most DP organizations spend more than 50% of their budgets on maintenance and most programmers devote 50%, and in some cases 80%, of their time to maintenance. The budgets for maintenance will keep on growing and may reach 60% by 1985 as we continue to add new code to the existing inventory.

Emerging and now rapidly spreading structured methodologies (structured analysis, structured design, structured programming and related productivity techniques) claim to produce more maintainable systems.

However, most work in these methodologies has been done in the front-end area of development. To my knowledge, no one except Warnier (and to some extent Warnier/Orr and Jackson methodologies) has yet provided guidelines for maintaining structured systems.

Some of the structured techniques can also be applied to maintain existing systems. The Warnier/Orr methodology and especially the powerful Warnier/Orr diagram have been used successfully for modifying and documenting existing systems.

The Warnier/Orr methodology, described later, is an offshoot of Warnier's Logical Construction of Programs (LCP) and Logical Construction of Systems (LCS).

Jean-Dominique Warnier of CII Honeywell Bull, France, is one of the original inventors of structured programming ideas. He is especially noted for developing the data-driven program and system design concepts.

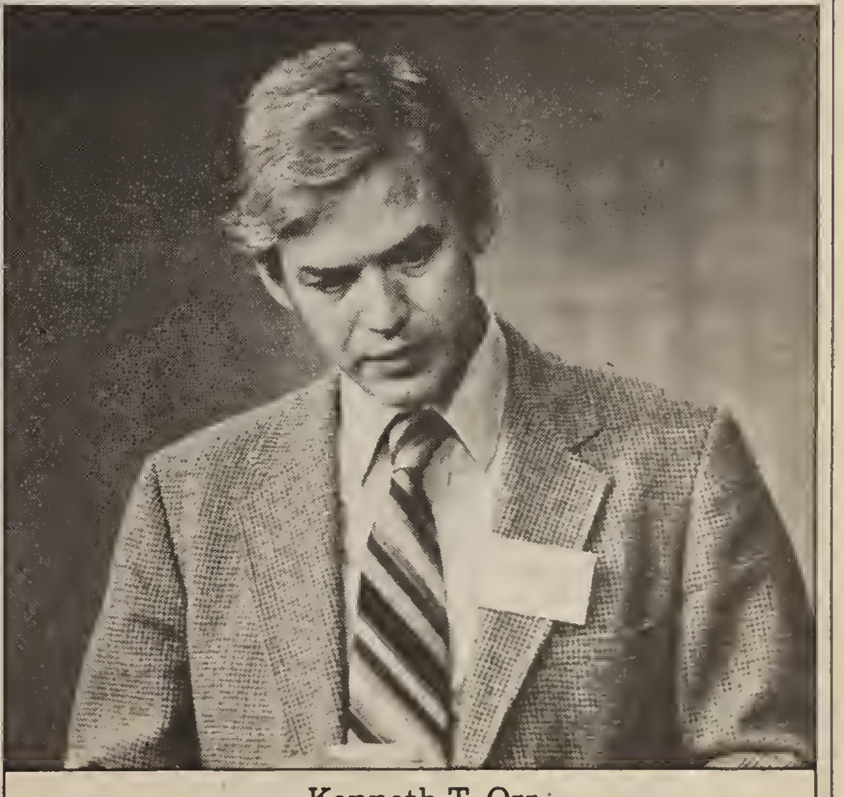
In the late 1960s, he completed development of a procedural method of designing programs, the Logical Construction of Programs (LCP). Warnier later developed the method of designing systems, theLogical Construction of Systems (LCS). The concepts of his methods are based largely on set theory and Boolean algebra. He invented the Warnier diagram, the principal designing tool of his methodologies.

Warnier is deeply concerned with change — the modification of programs and systems. In his book *Program Modification* he shows exactly how to do modifications of LCP programs. It is intriguing to know there is a way to do modifications correctly without upsetting the original structure of a program. Moreover, the documentation is also updated in the process, reflecting the changes in the program.

Warnier provides steps for converting an unstructured program to an LCP program in his book *Logical Construction of Programs.*

In the following interview, Warnier answers several questions regarding LCP/LCS and program modification:

(Continued on In Depth/12)



Kenneth T. Orr

© Copyright 1981 by Girish Parikh. Portions of this article are excerpted from the report "A Powerful Structured Tool: The Warnier-Orr Diagram" by Girish Parikh. The report (published in the series "Programmer Productivity Reports") is available for $12 (prepaid) from Shetal Enterprises, Department CW, 1787 B West Touhy, Chicago, Ill. 60626. Material from this article also appears in the author's book, The Guide to Software Maintenance, *to be published by Winthrop Publishers in 1982.*

(Continued from In Depth/11)

How effective are the program modification techniques? Do they always work?

The program modification techniques work except when the set of logical sequences is not correctly defined — for example, if empty sets are neglected. Sometimes the modifications are so important that it seems better to build a new program.

[Empty sets included in a design and coded in a program make future modifications easier. The concept of empty sets and its value are discussed later.]

Do programmers find modification work interesting or boring?

Programmers find modifications interesting on the conditions that they have to modify good LCP programs and they have learned how to modify a program.

Has much conversion work (existing programs to LCP) has been done?

Many conversion works have been done in many DP centers in many countries and we have no means to measure the result. In 1974, a French company converted 150 programs. The builder of the new computer had planned 450 days on programming and 450 hours on the computer for testing and debugging the programs. When all the programs worked on the new computer, only 150 days for programming and 75 hours on the computer had been used.

What effect does LCS have on modification and maintenance?

The effect of LCS on modification and maintenance is very important because the LCS systems make the technical organization of the data easy to change.

What is the user experience in modifying and maintaining LCP and LCS systems and programs?

The user's experience in modifying LCP and LCS systems and programs is very satisfying, but in many companies staff turnover is too important to ensure the continuity. For that reason, many good systems and programs are built, destroyed and rebuilt. It's more a problem of management and training than a technical one.

Has any automation been done for LCP/LCS procedures? For modification and documentation procedures?

We have a long-range plan to produce in my section software for modification and documentation procedures. The first step concerns the documentation of the DP system. For this first step, the LCS design was completed last February [1980] and half of the programs work.

What is the future? What will be the effect on the Warnier/Orr methodology?

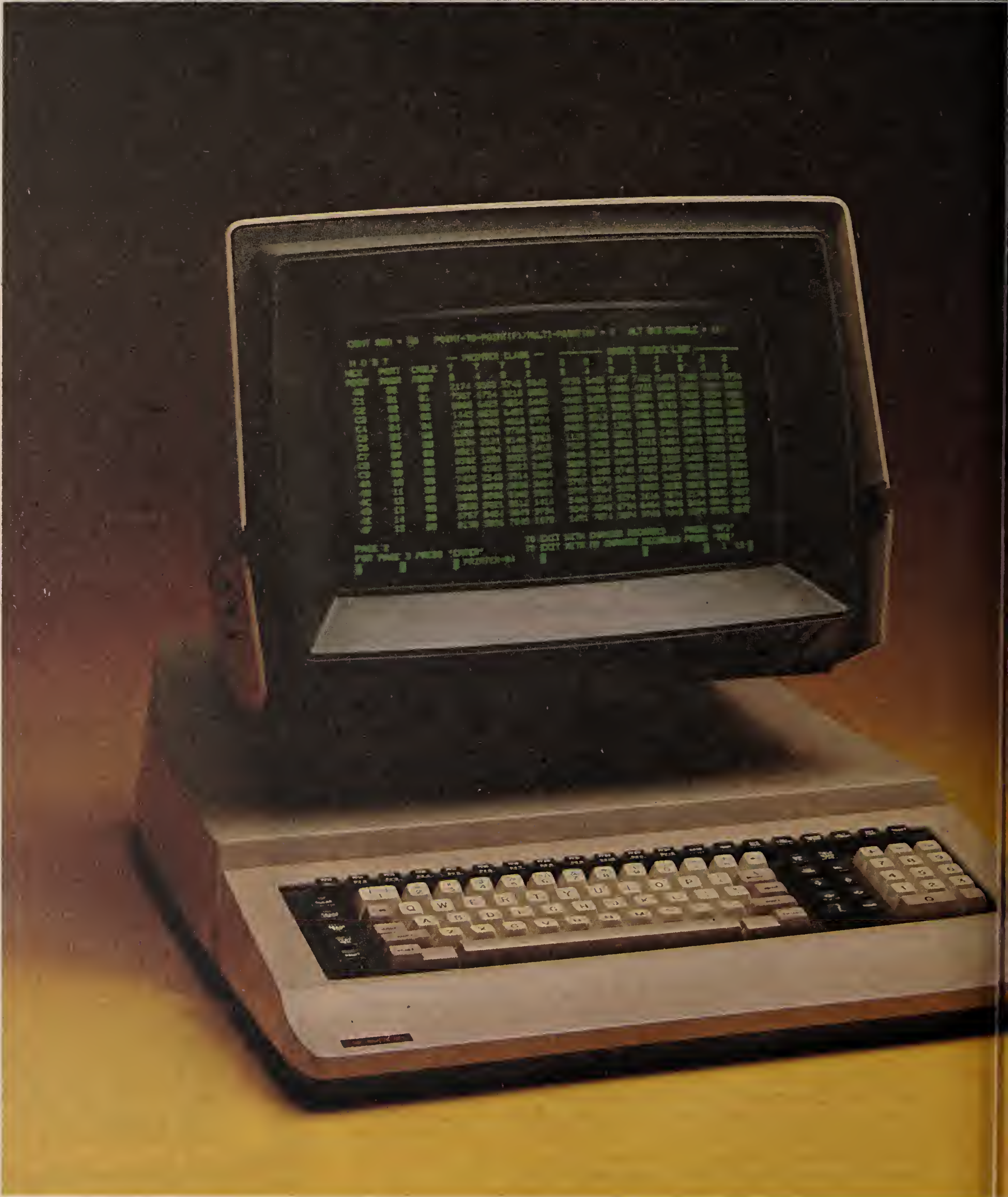
I think our methodology is a powerful one, but the use of a powerful tool could be true or wrong according to the goals sought.

Warnier/Orr Methodology

According to American systems scientist Kenneth T. Orr (of Ken Orr & Associates in Topeka, Kan.), one of the important elements of Warnier's work is the difference between the contents and the container. If the container — the design — is sound,

(Continued on In Depth/14)

Good news for 3270 users.



Case Study

Michael E. Coleman of Aetna Bearing Co., Chicago, chose Warnier/Orr diagrams for redevelopment. Here in his words is the logic behind his choice:

All 750 programs of Aetna Bearing Co.'s Data Processing Department must be redeveloped because we are converting from a Singer System 10 to an IBM System 38. The language utilized by the Singer is not compatible with an Ansi-standard language. Also, there are vast architectural differences between the machines that will produce a change in the logic of the program.

Our current system of development is unstructured. Usually, the programmer is given a rough description of a problem and begins coding immediately. Corrective iterations performed while writing the code often result in the omission of items and valuable time is lost. If this method were to continue, redevelopment would be long and tedious.

Theoretically, the method used should rely on available documentation, but in this situation no documentation standards had ever been established. Each program has comments and some narratives are available but not very reliable. File layouts exist for every file. The key factors of cost and learning time must also be considered since the manpower of the department is limited.

Thus, a logical solution would be to utilize current inputs and outputs to produce the new design. Warnier/Orr diagrams, which are data driven, were chosen because they meet many of the department's current requirements as well as those of the new data base-driven computer.

While the system design is being developed, structured code can be introduced at the same time. The three basic control structures are used and "GOTOs" disappear because they are designed out. (See "A Powerful Structured Tool: The Warnier/Orr Diagram," Girish Parikh, Shetal Enterprises, Chicago, 1980.) The condensability of Warnier/Orr diagrams eliminates mounds of paperwork and lengthy narratives and ensures proper documentation at implementation.

Warnier/Orr diagramming can be cost-effective to implement. It is a straightforward method that one can learn on his own by practice. Once the technique is learned, it can be applied to activities, functions or file layouts. Equally important, the diagrams can be understood by the users in the departments supported by data processing. Also, information regarding Warnier/Orr diagramming is readily available which, therefore, makes it Aetna's preferred choice.

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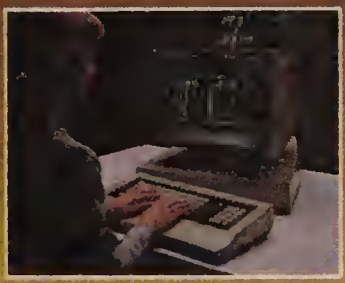

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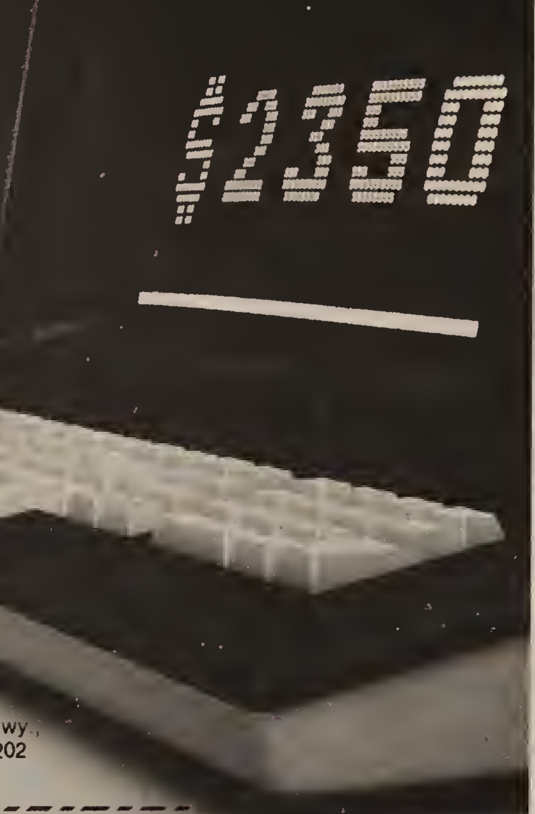

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IN DEPTH

(Continued from In Depth/12)

the contents — the program — can be charged or modified easily. Thus, Warnier has done profound work in data-driven design methodologies and his work on program and system modifications will have a farreaching impact.

Orr and his colleagues added to the LCP notation developed by Warnier. The Warnier/Orr methodology helps design systems, programs, data files and even manual procedures. It usually consumes more time in requirements analysis and design, but the coding and testing time and subsequent maintenance costs and efforts are considerably reduced.

After some practice, Warnier/Orr diagrams, the heart of the methodology, are surprisingly easy to read and use. They clearly show the hierarchy of the system. This improves communication among all involved. The hierarchical and symmetrical nature of the diagram makes the logical errors easy to spot. The Warnier/Orr diagrams will be dealt with in more detail below.

Design Phase

The output-oriented Warnier/Orr methodology starts with output definition. Using the Warnier/Orr diagramming technique, the designer then decomposes the outputs into individual data items. Thus a data control structure is developed from which program control structure is derived. The next steps refine and verify the design.

In the next step, time sequencing is studied. Using the Warnier/Orr diagram, the scheduling of the user-defined outputs is done into the processing cycles, such as annually, quarterly, monthly, weekly and daily. This step ensures that the needed inputs are available at the right time for each processig cycle.

Then comes the "change analysis." The question, "What real-world event could cause this item to change?" should be asked for every input item. If the changes cannot be incorporated into the design, then the design should be done again up to this stage. In addition, changes in the processing cycles should be considered at this time.

Finally, using the data diagrams already developed, the program structure is derived.

More details on the Warnier/Orr methodology may be gleaned from Orr's books *Structured Systems Development* (published by Yourdon, Inc.) and *Structured Requirements Definition* (published by Ken Orr & Associates), as well as from David A. Higgins' *Program Design and Construction* (published by Prentice-Hall).

Warnier/Orr Diagram

The Warnier/Orr diagram is a graphic design and documentation tool that has been called a "little giant" of the structured revolution. It is an extremely powerful tool for designing modifications and also for documenting existing systems. Let us take a closer look at the components of the diagram:

The Warnier/Orr diagram provides a formal method of hierarchic decomposition of entries. The entries may consist of activities, functions or data elements. For a particular decomposition, all the entries must be of the same type.

The Warnier/Orr diagram also includes a sequence of events of flow of control, and the basic structures of structured programming (sequence, alternation and repetition). The conventional hierarchy chart does not show the relationship between various functions.

The Warnier/Orr diagram shows the hierarchical structure as well as the process flow (where, when and how many times an event occurs). How does it show all this?

The events occur in the sequence from left to right and top to bottom for each column (beginning from the left). The symbols in the parentheses below the names of each item in the diagram show the number of times that item occurs. The brackets enclose logically related operations. The hierarchy is also from left to right, which can be observed by turning a Warnier/Orr diagram 90° clockwise.

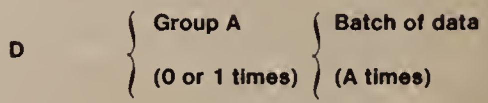
Following are symbols and their meanings, when listed below a function:

(N): The function is executed N times, where "N" is a variable. A meaningful variable is usually chosen. For example, PRINT POLICIES, means execute the "PRINT POLICIES" function (P) times for P number of policies.

Note that "N" could be zero. This notation provides DOWHILE structure.

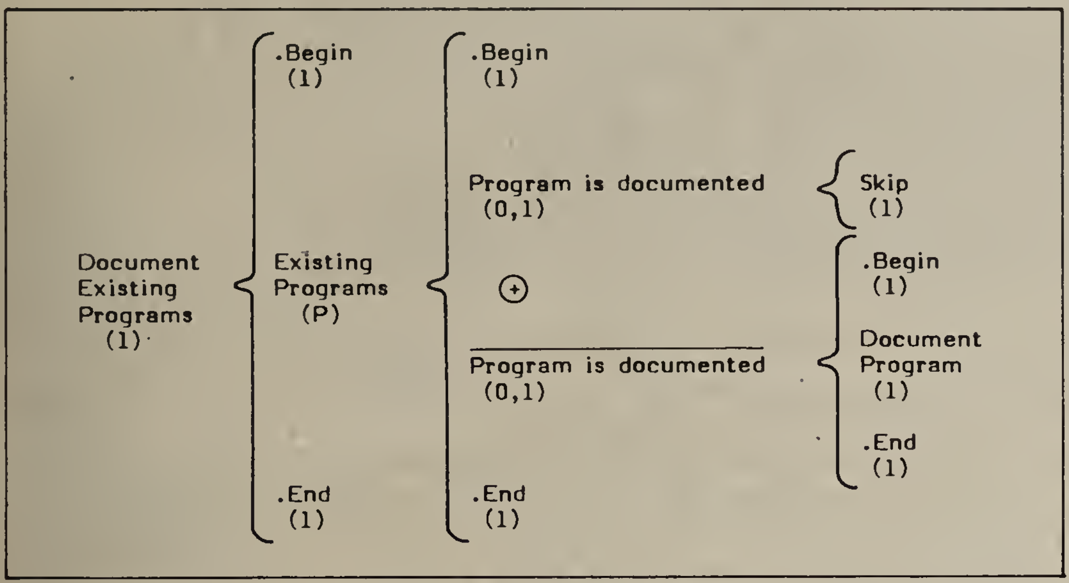
For a DOWHILE structure, Warnier provides a better structure in his book *Logical Construction of Programs* (published by Van Nostrand Reinhold Co.) making the future modifications easier:

"If a set of data is present A times in a set D and if A can be O," Warnier states, the hierarchical organization of the data can then be described as follows:



When "N" is not a variable, but a fixed number, for example 12 — representing the months in a year — it can be expressed as "12" if iteration is to be done 12 times; otherwise, the notation would be "(0,12)." If a function is executed only once, "(1)" is usually omitted.

(0,1): The function is executed zero to one times, depending on whether the function has not been selected or has been selected at this point. This notation provides the alternation (or selection) structure (in conjunction with the exclusive OR symbol "0" explained later). The case structure is a "generalized" alternation with more



Warnier/Orr Diagram for a Manual Procedure (Document Existing Programs)

than two cases to consider.

(1,t): The function is to be executed at least once, and possibly (t) times. When t is a fixed number, such as 12 months in a year, "(1,12)" can be used, meaning one to 12 times. This notation provides the DOUNTIL structure.

⊕: This symbol appears between the names of two (or more) functions and signifies exclusive choice between two or more functions. It is used in conjunction with "(0,1)" notation, and means one or the other, but not both.

With the above notations, the three basic constructs of structured programming — sequence, alternation and iteration (both DOWHILE and DOUNTIL) — and the additional case structure are added to the hierarchical diagram, providing order and logic and making it comprehensive. In case of iterations, it also tells (using a variable or a constant) how many iterations.

+: Inclusive OR — that is, one or the other or both. (This symbol is also used for concurrency.)

Note that for most applications, exclusive OR and sequential operations are sufficient.

———: Appears above the name (of a function) and means not. For example, $\overline{\text{EQUAL}}$ means NOT equal.

The following are conventions: Each function comprises the subfunctions "Begin" (initialize, open files and so on), "Process" and "End" (such as close files and print totals). The subsequent functions are decomposed in a similar fashion ("Begin," "Process," "End").

This structure of functions is based on the fact that logically certain events can happen at the beginning of the functions, while others take place in the processing and the remaining occur at the end. (This structure also makes the future maintenance and modification of the program easy.)

An example of a Warnier/Orr diagram is shown in the accompanying figure, depicting a manual procedure familiar to us!

There are two aspects of the maintenance problem: One is dealing with the existing, mostly unstructured or semistructured code. The second aspect is maintaining the structure of the structured systems while modifying and maintaining them.

The first aspect, already critical, is likely to become more severe as we keep adding new code (structured, it is to be hoped) to the inventory and do not replace the old code. The acute shortage of resources prevents the early redevelopment of existing code. The old code generally works; however, modifying and maintaining it is usually a problem.

The Warnier/Orr methodology and the diagram can help solve both aspects of the maintenance problem.

The Warnier/Orr methodology is for effective, efficient and economical development, as well as for change and redevelopment — that is, maintenance.

Because of the structure provided by the Warnier/Orr methodology to new programs (and enhancements to existing programs), modifications are easier. The symmetry of programs make missing elements easier to spot. Each bracket of the Warnier/Orr diagram has "Begin" "Process" and "End." Even if nothing is to be done in "Begin" or "End" in a particular activity, those sets must be coded. (They are called empty sets in this case.) This makes future modifications easy.

Modifying Existing Programs

The Warnier/Orr diagram is an effective tool for designing modifications to an existing program. I designed major modifications to the programs originally designed, using a functional hierarchy chart of Hipo. With the Warnier/Orr diagram, the modified programs worked on second effective tests.

The designing for the proposed modification was fast because the diagrams were easy to draw and needed very little writing. Alternate designs were done on paper, preventing costly alterations during or after coding. The evaluation of alternate designs was easy because they were compact and precise.

After the design decision was made, transferring it to code was a relatively simple process.

Orr, in his article "Warnier/Orr Technology and Systems Maintenance" (from "Futures," a quarterly newsletter published by Ken Orr & Associates, Vol. 3, No. 2), gives the following guidelines for documenting existing systems with the Warnier/Orr diagram.

The Warnier/Orr diagram has been used successfully to document existing systems. The "in-out" or "assembly line" version of the diagram is used. Systems are often easier to document at the top. It is simpler to document at the procedure and program level than it is below. Make the first cut at process documentation.

The first cut at data documentation might be to develop Warnier/Orr diagrams of the major data files or data bases within the system. Diagrams should be done strictly from a logical standpoint. By documenting the data files, it is possible to come up with a dictionary/directory describing what data exists and where it is used.

The long-term goal in structured maintenance is to replace the existing system over time, piece by piece from the output back.

Documenting Existing Programs

It has been found that any program can be documented with the Warnier/Orr diagram.

Existing programs should be documented incrementally (while modifying and maintaining them). The emerging documentation for the data structures inherent in the program should be studied. Such documentation, like schematic diagrams, is a valuable aid to maintenance.

Eventually, this documentation helps in reorganizing the programs using the data-structured approach. Thus, it is a two-step process:

1. Study the structures of existing programs and produce the Warnier/Orr diagrams for the data structures (mark lines of code for each structure in the existing program). This diagram is useful in current maintenance and enhancement work.

2. Use the Warnier/Orr diagrams to redesign and rewrite the programs incrementally.

Jim Hanna of the Office of the Administration for the Courts, State of Washington, studied the program maintenance histories to find out whether structured systems continue to be "better" systems after they become operational. He found too many variables to be able to draw conclusions.

However, one aspect intrigued him. All programs had been developed using structured techniques, yet some required considerably more time to maintain than others.

On further analysis, Hanna found that among the structured programs, the traditional structured programs (programs developed top-down, consisting of modules with limited entry and exit points and using structured code) required highest maintenance.

But the traditional structured programs were better than the unstructured ones. In the former, the amount of coupling between the components was reduced, cutting down maintenance. However, the effect of binding between the program structure and data structure remained unaffected.

The second group of programs used the structured techniques (mentioned earlier), and were data structured according to the Warnier/Orr technique. They required less main-

(Continued on In Depth/18)

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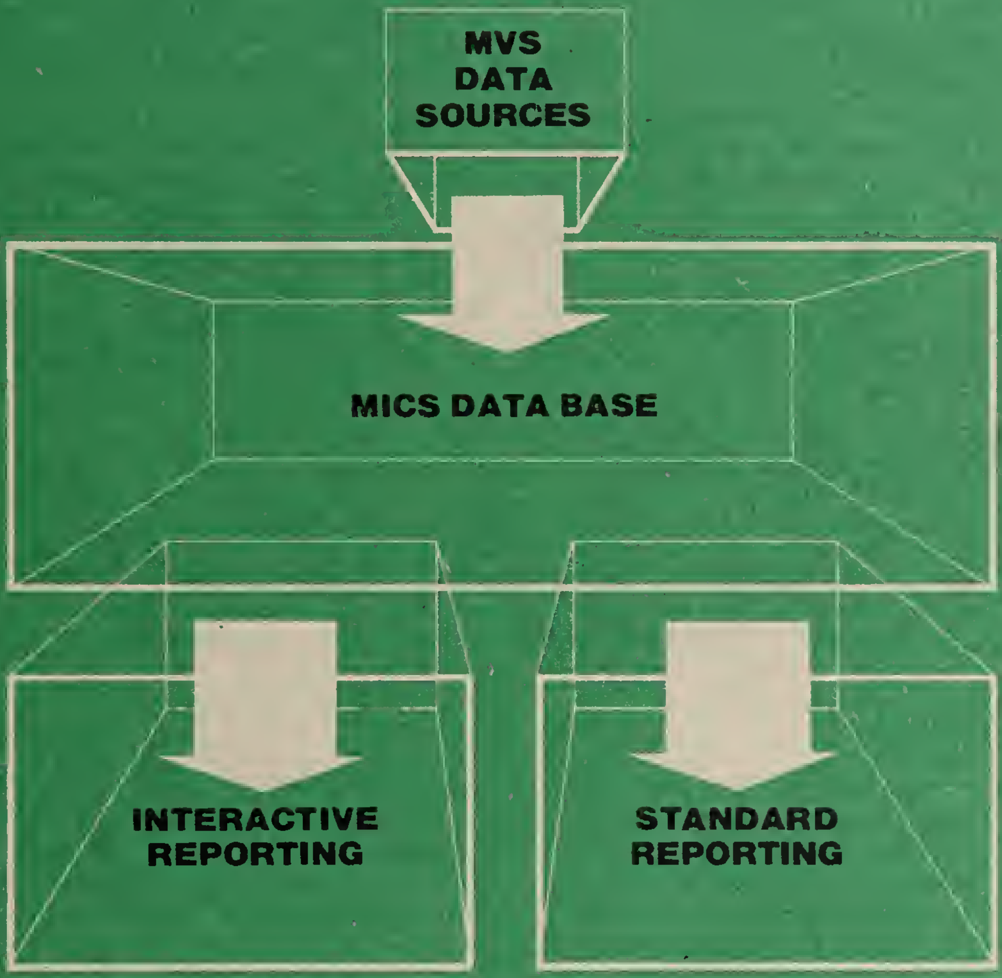

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(Continued from In Depth/15)

tenance than the first group; however, changes to the data structure to meet changes to requirements increased maintenance.

The third group of programs were developed according to the method Orr and Associates calls Structured Systems Development (SSD). In these programs, program coupling and data-structure binding were reduced, because of the Warnier/Orr approach of starting from the real-world output data structure to program structure to input structure. These programs needed the least effort to maintain.

Automating With 'Structure(s)'

Structure(s) is a systems development and documentation package that helps designers, analysts and programmers to document and maintain existing programs and systems. It also supports new development from the beginning. As new pieces of the system take shape, they are consistently integrated into the system and a set of formatted, cross-referenced documents is generated.

The heart of the package is a document handler, which assembles and draws Warnier/Orr diagrams on a line printer. The designer may control the formatting of the diagrams.

The package also includes features to:

- Report and maintain all diagram cross-references.
- Report and flag all undefined cross-references.
- Produce an index of all the elements used in the diagram.

It is a batch-oriented system. The package may be interfaced with any of the popular source library systems. It is written in Cobol and designed for IBM computers, but is easily installed on most other machines. It requires a minimum partition of 210K bytes for IBM systems.

The package is available from Ken Orr & Associates, Inc., 715 E. 8th St., Topeka, Kan. 66607.

The same vendor is currently developing on-line Structure(s), providing capabilities of on-line development and modifications of Warnier/Orr diagrams. A program generator, capable of generating a Cobol program directly from the input to Structure(s) is also being developed.

The enhanced version of Structure(s) (Version 3.0) supports the IBM laser print and asynchronous terminals. Source code is provided. Improved error handling is included and additional hardware and operating systems are accommodated. This package provides the capacity of Documentation Processing — it makes it simple to use an existing Warnier/Orr diagram to create the next diagram needed, or to use it as a model to create similar systems.

The 1960s and 1970s were spent in developing and propagating the structured technologies. The rapidly emerging software engineering disciplines now comprise management and technical functions and include structured technologies. Software maintenance from all angles, including conversion, redesign and redevelopment is an extremely important part of software engineering.

The 1980s and perhaps 1990s will be spent in refining and further propagating the structured technologies.

About the Author

Girish Parikh, president of Shetal Enterprises, is an author, consultant and lecturer. He is the author/editor of "Programmer Productivity Reports," "The Software Maintenance Newsletter" (both published by Shetal Enterprises) and a book Techniques of Program and System Maintenance *(published by Ethnotech, Inc.). He specializes in software maintenance and structured technologies.*

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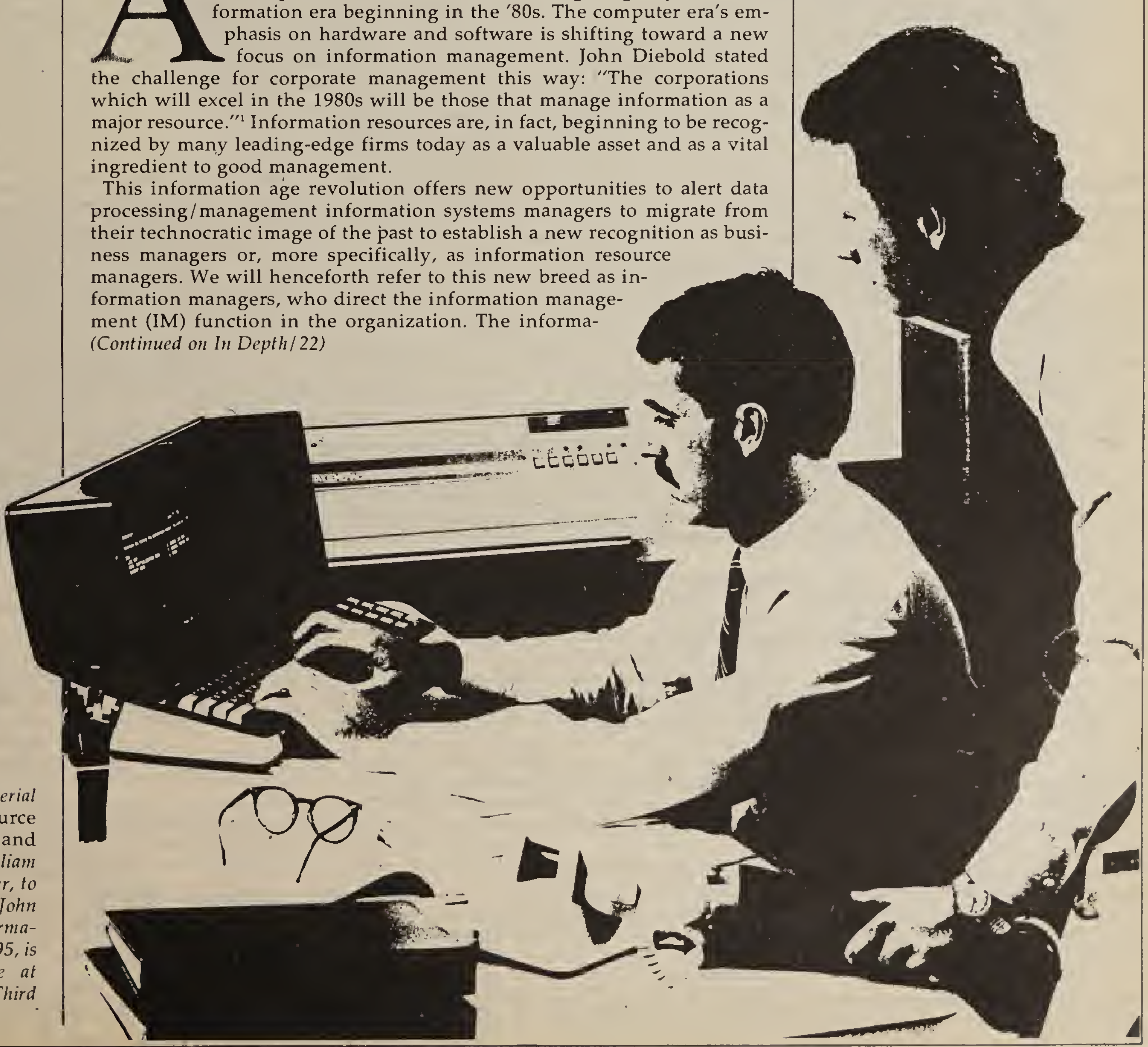
By William R. Synnott

CHANGING ROLES FOR INFORMATION MANAGERS

A quiet revolution is taking place in the data processing industry. The computer era of the '60s and '70s is giving way to the information era beginning in the '80s. The computer era's emphasis on hardware and software is shifting toward a new focus on information management. John Diebold stated the challenge for corporate management this way: "The corporations which will excel in the 1980s will be those that manage information as a major resource."[1] Information resources are, in fact, beginning to be recognized by many leading-edge firms today as a valuable asset and as a vital ingredient to good management.

This information age revolution offers new opportunities to alert data processing/management information systems managers to migrate from their technocratic image of the past to establish a new recognition as business managers or, more specifically, as information resource managers. We will henceforth refer to this new breed as information managers, who direct the information management (IM) function in the organization. The informa-

(Continued on In Depth/22)



This article draws upon material from the book Information Resource Management: Opportunities and Strategies for the 1980s, *by William R. Synnott and William H. Gruber, to be published later this month by John Wiley and Sons, Inc. Further information on the book, which costs $24.95, is available from Maribeth Payne at John Wiley and Sons, Inc., 605 Third Ave., New York, N.Y. 10016.*

(Continued from In Depth/18)

tion manager of the future will have varied roles: strategic planner, change agent, proactivist, businessman, politician, integrator, information controller, strategist, staff professional, manager, futurist.

The most important of all, however, will be recognition as the firm's *chief information officer.* Just as we have chief executive officers (CEO) and chief financial officers (CFO) in firms today, the information age will herald the new function of chief information officers (CIO), who will be responsible for managing corporate information as a major corporate asset. This is the proper role of the information resource manager.

The CIO will identify, bring together and manage information as a resource. This will not only involve the adoption of new roles in the organization, but will necessitate the development of specific management strategies designed to achieve new goals.

In this article, we identify three important roles for information resource managers, or CIOs, in the 1980s and suggest a strategic planning methodology and specific strategies designed to help effect the transition from data processing to information resource management (IRM).

Proactive Change Agent

The objective of the proactive change agent role is to increase the overall influence and effectiveness of the IM function in the organization. This is important in order to achieve the overall mission of optimally supporting the company's information systems and services needs.

One way to achieve this is by promoting the IRM concept. Another is to extend the IM function through merging with other information resource functions such as telecommunications and office systems.

A third is to proactively "sell" automation to increase its penetration in the organization. This means seeking out opportunities for applying technology to the solution of business problems. In a reactive approach, one says: "What can we do for you?" In a proactive approach, one says: "Here's what we can do for you!"

The proactive change agent is really a planning role. Therefore, we suggest three planning strategies that can be useful in carrying out the role: management by strategies, technology forecasting and business systems planning.

Management by strategies (MBS). MBS is a strategic planning concept. Using a process described as situation analysis, MBS recognizes that corporations, like people, are all different and require different strategies.

It's all a matter of proper fit. MBS is a holistic strategy that recognizes that results-oriented information management and optimal IM effectiveness can be attained only by achieving a proper fit with the organization. Fit, in this sense, means: 1.) understanding your environment, 2.) defining your role within that environment and 3.) developing strategies that fit the two together.

The process can be reduced to three questions: What are the organization's needs? What technology is available to meet those needs? What can the IM function do to match these up? MBS, then, pulls together four things:

- Corporate objectives.
- User needs.
- Technological trends.
- IM's role in the organization.

For instance, in the figure we show several factors common to all businesses: the company, users of information services, technical trends and the role of IM in the organization. Next to each corporate environmental factor, we list specific strategies that might be appropriate to it. IM objectives, for example, would be developed to dovetail with corporate objectives. Systems backlogs might be addressed through formulation of an IRM committee to establish priorities and allocate resources. Distributed processing might be coordinated and controlled through the issuance of company standards over distributed resources.

Whatever the solution or strategy employed, each is geared to a specific objective. If management by objec-

(Continued on In Depth/22)

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(Continued from In Depth/20)

tives (MBO) provides the methodology for the planning of goals and objectives, management by strategies (MBS) provides a methodology for implementating the strategies designed to attain those goals and objectives.

Technology forecasting. This is a strategy aimed at providing technical input to the corporate planning process. James Martin said: "The single factor most affecting how corporations are managed in the 1980s will be technology."[2] In *The Third Wave,* Alvin Toffler suggests that the new civilization and the computer revolution (the third wave) will follow the industrial revolution (the second wave) as one of the most potent forces in our society.[3] The great dependence of most major companies today on their computer resources attests to the importance of technology forecasting in the corporate planning process.

Consider this hypothetical example: Bank A decides to build 10 more branch offices at a cost of $500,000 each. Bank B up the street installs 100 point-of-sale terminals ($2,000 each) in supermarkets and retail outlets to provide electronic banking to its customers. Bank A ends up with 10 more outlets at a cost of $5 million. Bank B has 100 banking outlets at a cost of $200,000. Bank A has clearly gone the wrong way because of a lack of awareness of a technological trend.

Technology forecasting can be a simple five-step process:

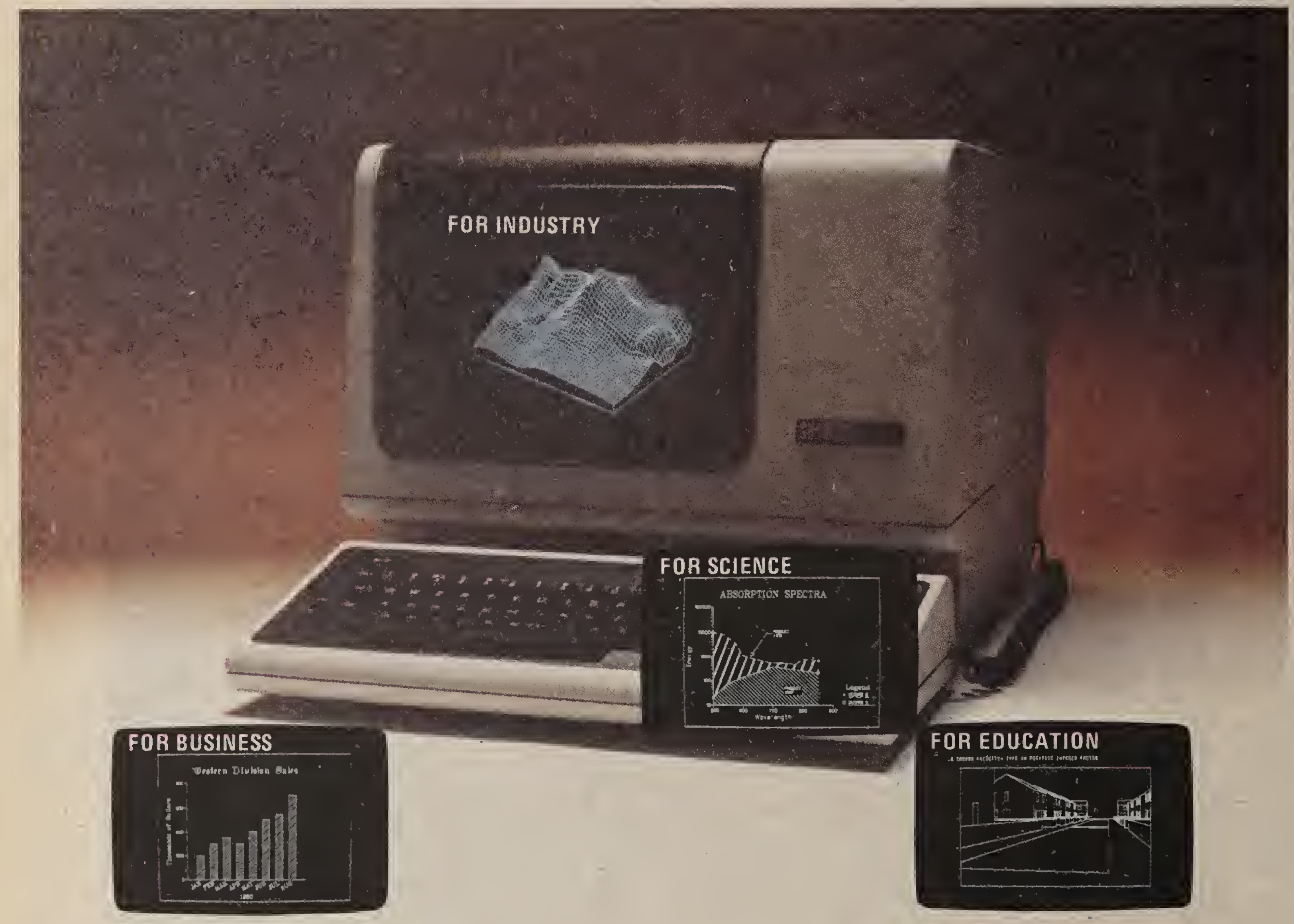
1. Identify key technical trends. Research the key trends that will probably have a significant impact on the organization, such as telecommunications advances, distributed processing and the spread of minicomputers, office automation and trends unique to a specific industry such as electronic funds transfer systems (EFT) in banking.
2. Analyze the industry impact. What will be the likely spread and development of the trend within your industry? What will be the competitive considerations? Cost and/or organizational implications?
3. Analyze the company impact. Develop scenarios of various possible impacts on your company. Analyze alternatives and develop an appropriate plan of action to present to senior management.
4. Determine an appropriate role. What role should the information manager play to help bring about the changes suggested in the analysis? What leadership should be exerted and how?
5. Develop strategies. Once goals are known, develop a few strategies for accomplishing those goals, strategies that are custom-fitted to the needs of the organization as described earlier under MBS.

Business systems planning. In a recent *Harvard Business Review* article, Richard Nolan suggested analyzing company functions based on the type of systems currently installed: operational systems, management control systems and strategic planning systems.[4] He suggested that those departments with the heaviest concentration of operational systems are in the early stages of data processing growth, and those with more management control and strategic planning systems are in more advanced stages.

Such an analysis can help information managers zero in on management systems opportunities in the organization. One strategy for carrying this out is business systems planning (BSP). BSP methodology combines top-down analysis with a bottom-up development strategy. Top-down analysis identifies needs through executive interviews, defines priorities (ranking of systems based on some criteria, such as ROI) and determines systems resource availability. Bottom-up development identifies information data base needs, develops systems solutions and establishes implementation goals (scheduling tasks and manning requirements).

The basic steps of BSP are:

1. Determine the scope of planning.
2. Select the team (or start with an ad hoc task force).
3. Begin the search to identify new project opportunities (that is, learn the user's business needs and priorities).
4. Define the highest priority sys-



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tems (rough requirements and preliminary cost/benefit analyses).

5. Get initial systems studies approved and turned over to the systems development group.

6. Begin planning the next level of systems needs.

BSP objectives are to establish a long-range plan for systems development and a short-range plan for implementing the highest priority systems first. BSP is active in the planning phase only, which usually constitutes less than 5% of an entire project.

Coalescence Planner

Our second role, that of coalescence planner, starts with having the right identification. The data processing business today must realize it is in the broader business of information management. Hence, it should be called the information management function or information systems or information services. Not data processing, DP or even MIS, a term that has never lived up to its earlier expectations.

With the right identification — an identification that is broader in scope and function, which establishes the information manager as manager of information resources, as the information architect and the chief information officer of the firm — coalescence of information resources can begin. What are these information resources?

First, they are the technical delivery systems: computers, communications networks, information data bases. They are also the information sources in the firm: automated systems, data files, manual systems, office systems, paperwork and other hard data, as well as soft data (verbal information sources). And they are people resources: technical people such as analysts and programmers, information workers such as office, operations and administrative people and managers who work with information.

Some of the information resources to be brought together include data processing, text processing, telecommunications, management sciences, manual systems and procedures, administrative services, paperwork management (records, forms, reports), printing, facsimile (document distribution), micrographics, libraries, office systems, mail services, distributed processing resources and the issuance of corporate policy and other corporate instructions.

The list can be as limited or extended as your imagination. It makes sense to say that the issuance and dissemination of corporate policies is an information service of the information management function; it would make no sense to have corporate policies issued by data processing.

The right identification is key! This is not to suggest that all information resources should be organizationally under the IM function. In some cases, such a reorganizational alignment might make sense and lead to more efficient information management, such as the merger of computers and communications which have become technological Siamese twins. In other cases, for a variety of organizational, management or political reasons, this would not be feasible.

Nevertheless, it is the information manager's job to have a program for identifying the firm's information resources, for putting in place the delivery systems to make information available as needed and to integrate the diverse pieces, products and technologies in ways that make sense out of corporate information resource management. This should include strategies for coordinating and controlling such technical tends as distributed processing, office automation and telecommunications network management within the company.

It might be useful to see how these are being brought together at The First National Bank of Boston:

- ***Distributed processing*** at the bank was first suggested by the IM function in 1972 as an appropriate way to automate far-flung international offices. A common, standard system was developed and installed in the various branches. Each office ran its own computer, receiving technical support as needed from regional data centers. The compatibility of the systems allows for easy transmission of data between offices and headquarters for information consolidation and control.

Within the head office itself, as a number of other special-purpose minicomputer installations began to spring up, the IM function was given responsibility for the coordination and control of data facilities. Distributed data processing standards were issued to all computer users for the purpose of ensuring technical consistency, compatibility, standardization, control and security over these distributed information resources. This enabled distributed processing to develop in a controlled, rather than anarchic, manner.

- ***Office automation*** coalescence has proceeded through a leadership role assumed by the IM function for implementing a phased office automation plan as follows:

Phase 1. Text processing. Select standard equipment to be installed and begin with pilot installations in those bank areas that have shown greatest interest.

Phase 2. Proliferation. Increase the number of installations and add additional administrative functions to office workstations.

Phase 3. Integration. Merge data and word processing, add telecommunications capability, integrate diverse office system components.

Phase 4. Management functions. Automate functions performed by managers where significant productivity can be realized.

This plan, developed and implemented by the IM function with senior management support, allows for the orderly progression of integrated office systems with least organizational disturbance. The office systems group simply added new "tools" to existing office activities. All office systems components are being carefully brought together by a single control group within the IM function.

- ***Telecommunications.*** The logical and necessary merger of computers and communications in recent years suggested an organizational change was needed, since the telecommunications function was attached to another division. The case was made to senior management that on-line systems management and information movement around the organization would be better served if computer and communications planning were done by the same people. The telecommunications department then became part of the IM function.

In all three cases, coalescence was accomplished in different ways. In the first, standards were issued to ensure the compatibility, efficiency and effectiveness of distributed resources. The second involved a long-range plan, a leadership role and no organizational disturbance. And in the last example, the organization was actually realigned. The strategies used were custom-fitted to the environment.

Broader Role

All of these coalescence activities are part of the broader role of information managers. Paul Strassman of Xerox Corp. stressed the need for investing in information management and broadening the traditional role of data processing this way: "To understand this investment process requires insights that stretch beyond computer technology. Telecommunications, word processing, administrative systems, decision systems are some of the classifications . . . As advanced stages of growth are attained, the EDP executive will be left to grapple with technology. His boss — the information [management] executive — will manage the new invest-

(Continued on In Depth/26)

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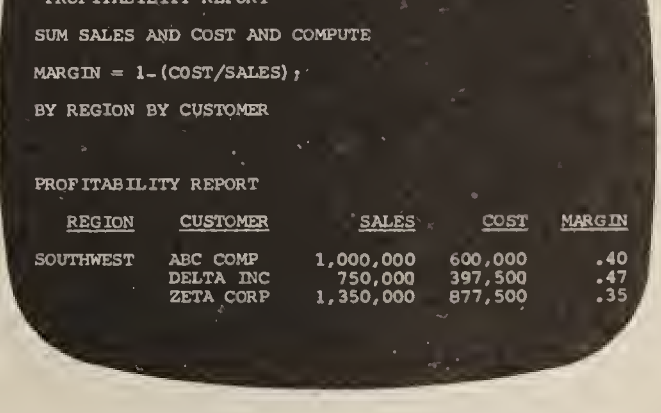

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(Continued from In Depth/24)

ment opportunities leading to dramatic improvements in overall organizational profits and performance."[5]

And C.W. Getz said: "Coalescence is the inevitable fate of data processing . . . The message is clear; either the MIS manager will take the initiative to lead this merger of the firm's data resource activities and make some sense of their management, or a manager outside of the MIS organization will do it for him."[6]

A strategic plan will be needed. The information activities will not coalesce by themselves. Information managers can lead the change by taking the following steps:

1. Get top management support for an IRM program in the organization.
2. Identify all major information resources in the firm.
3. Plan the logical coalescence of diverse functions that process information into cohesive systems.
4. Establish corporate policies for IRM, corporate date base standards and distributed processing resources.
5. Identify needed organizational rearrangements necessary to manage corporate information resources more effectively.
6. Implement changes slowly, one logical step at a time, but all as part of an overall IRM strategy.

Integrator

In his well-known hypothesis on the stages of data processing growth, Richard Nolan suggested that many DP organizations are at a transition point, moving from the computer era to the information era, and that the first half of the 1980s will mark the integration stage of growth.[7] The coalescence planning role discussed above is part of that integration.

But there is another integrator role that will be equally, if not more, important in the '80s — *people integration*, or more specifically, the successful integration of the IM function with users and top management. Information managers face the challenge of finally closing the communications gap with top management. To do this, they will have to shed their technical cloak and the image of the technical back shop that it represents. They will need to become businesspeople first and technicians second. This will require learning the business — understanding its problems, its business needs — then applying their tool in trade, technology, to the solution of business problems, not just to technical problems. The business-oriented information managers of the future who successfully cross over this technical bridge will find themselves promoted to top executive roles in their companies.

Many DP managers in the past were passed up for top executive jobs because they were not perceived as general managers, but as technical specialists. In fact, many information managers themselves are being replaced by managers from the business side of companies rather than by technically trained managers. Michael Scott Morton of MIT underscored this when he reported: "An informal survey as part of one of the CISR (Center for Information Systems Research) studies showed that in 180 companies (mostly Fortune 500), 96 had had changes in the holder of the top DP or MIS position within the last 18 months. Of these 96 new appointees, 74 were user executives. That is, they had been in line or staff positions of real authority and had no significant previous training or exposure to computers."[8]

Clear Message

When three-quarters of new information managers at large corporations are coming from the business side of the house, the message is clear:

Top management wants business managers who are effective at solving business problems more than they want technical managers who are efficient at solving technical problems. The successful information manager of tomorrow will integrate well with user and senior management groups, not because they will understand computers, but because the information manager will understand their business. This new breed of information manager will, among other things:

- Learn the business to increase automation penetration and effectiveness.
- Get involved in corporate planning, merge corporate information and systems planning.
- Demonstrate management ability, not just technical ability.
- Reposition the IM function in the organization, adopt the IRM role.
- Communicate well and often with top management.
- Develop better performance measures to evaluate IM's contribution.

Here are four strategies that can help accomplish these goals:

Automation penetration. Some divisions in every company are large users of IM services and some use them very little, even though they might be able to benefit greatly from such services. Often, this is because of a low technology awareness level, or computer illiteracy. In such cases, it may be easier to learn the users' business than to teach them about computers. An effective way to do this is through what we have dubbed the "Trojan horse" strategy. This approach spreads automation into a user division for the benefit of both the user and the company.

This is accomplished by transferring a senior-level, systems-trained individual into the target division as a systems coordinator, or even a line manager (good career path). As the individual learns the business, his systems training soon results in ways to apply technology to the division's activities.

Shared management. It was suggested earlier that integration of the IM function with user and senior management would be important in the evolution of technically oriented data processing to business-oriented information management. One way to bring this about is through the shared management of information resources.

With the trend toward decentralization of data processing, another strategy for shared management that can be very effective is the *product manager* approach. This strategy offers the user customer an alternative to centralized (shared) processing. The alternative is to dedicate information resources (computers, analysts/programmers and a DP manager) to the user.

As a stand-alone DP activity managed by the IM function, the DP "product manager" operates in a matrix management fashion, reporting administratively to the IM function and functionally to the user customer. In other words, the IM function operates, in effect, under a facilities management contract with the user. This provides professional management while also giving the user dedicated (decentralized) resources — a truly shared management arrangement that avoids the pitfalls of putting complex DP activities directly into the hands of inexperienced users.

Customer services. Maintaining good service levels is probably the most critical success factor for any IM organization. Top management in most companies still evaluates IM based heavily on user feedback regarding service levels. The problem is that service management is rarely a formalized process.

A strategy to attack this problem is the use of *customer service contracts* between IM and users. This arrangement can be set up as follows:

1. Conduct a user satisfaction survey to find out each user's perception of his service (perception and reality are often miles apart).
2. Define together what constitutes good service levels (downtime, terminal response time, report delivery deadlines, quality of product [reruns?]).
3. Establish performance objectives based on No. 2, which can serve as

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the basis for a customer service contract between the IM function and each user division.

4. Measure actual performance against objectives and report results to the user divisions monthly or on some other periodic basis.

5. Prepare a "report card" to senior management annually on service-level results, preferably cosigned by the user (indicating agreement).

Top management focus. Just as user involvement is so indispensable to successful systems development, so top management involvement with the IM function will be critical in the organization of the '80s. This was underscored by William Woodside, president of American Can Co., who spoke of the necessity for top management involvement in information planning: "Taking this kind of strategic look at our information capabilities and needs was not a minor undertaking. It required, of course, my own commitment, but more importantly included extensive involvement of virtually all the executive and senior management in our entire corporation. I believe this level of involvement is "absolutely essential for the success of any company's information function.'"[9]

If, indeed, there is a communications gap between senior managers and IM function managers, then the answer is obviously to create better communications. Here are three strategies for focusing on top management through better communications:

- **IRM committee.** If one is not already in existence, establish an IRM committee composed of senior-level managers (including the CEO). In the process of establishing priorities and allocating scarce resources on a "what's-best-for-the-company?" basis, they will become more involved with the IM function, will understood its issues and problems better, will foster communications and involvement in the information resource management process.

Activities of the IRM committee might be to:

a.) Establish corporate information policies, standards and procedures.

b.) Review and approve IM's long-range plan and short-range budget.

c.) Establish priorities between competing users and allocate IM resources.

d.) Evaluate and approve investment proposals for information systems, computer equipment, software contracts.

e.) Monitor major project development.

f.) Provide better communications between IM and top management.

- **Performance measurement.** The IM function's dilemma is that the benefits of automation (jobs saved, new revenues, increased productivity) inure to the users while the costs (computers, technical staff) remain in the IM function. It is not always easy to demonstrate the contribution of the IM function to the organization. It is sometimes viewed as a cost-adding function instead of the value-adding function it usually is.

To help top management to better evaluate IM's contribution to the firm, the IM manager needs to develop a performance measurement and reporting system. Types of measures used might include the following:

1. Company vs. IM measures. Gross performance measures in business include sales growth, profitability and return on investment (ROI). Their counterparts in IM are budget growth, productivity and ROI. Budget growth must be shown to reflect increased output (value added), not just increased costs. DP productivity is measured in cost reduction. ROI can be demonstrated as return on systems projects.

2. Global measures. Broad global measures might compare IM expenses to sales or total expenses, or IM staff to total staff, or IM equipment to total assets — all compared with industry averages.

3. Systems development measures — cost/benefit analyses showing ROI over the life of the new system and post audits that measure operations before and after automation.

4. Data processing measures — not just work load charts showing growth, but productivity measures that show unit costs declining.

5. Service measures. Customer service contracts discussed earlier are an

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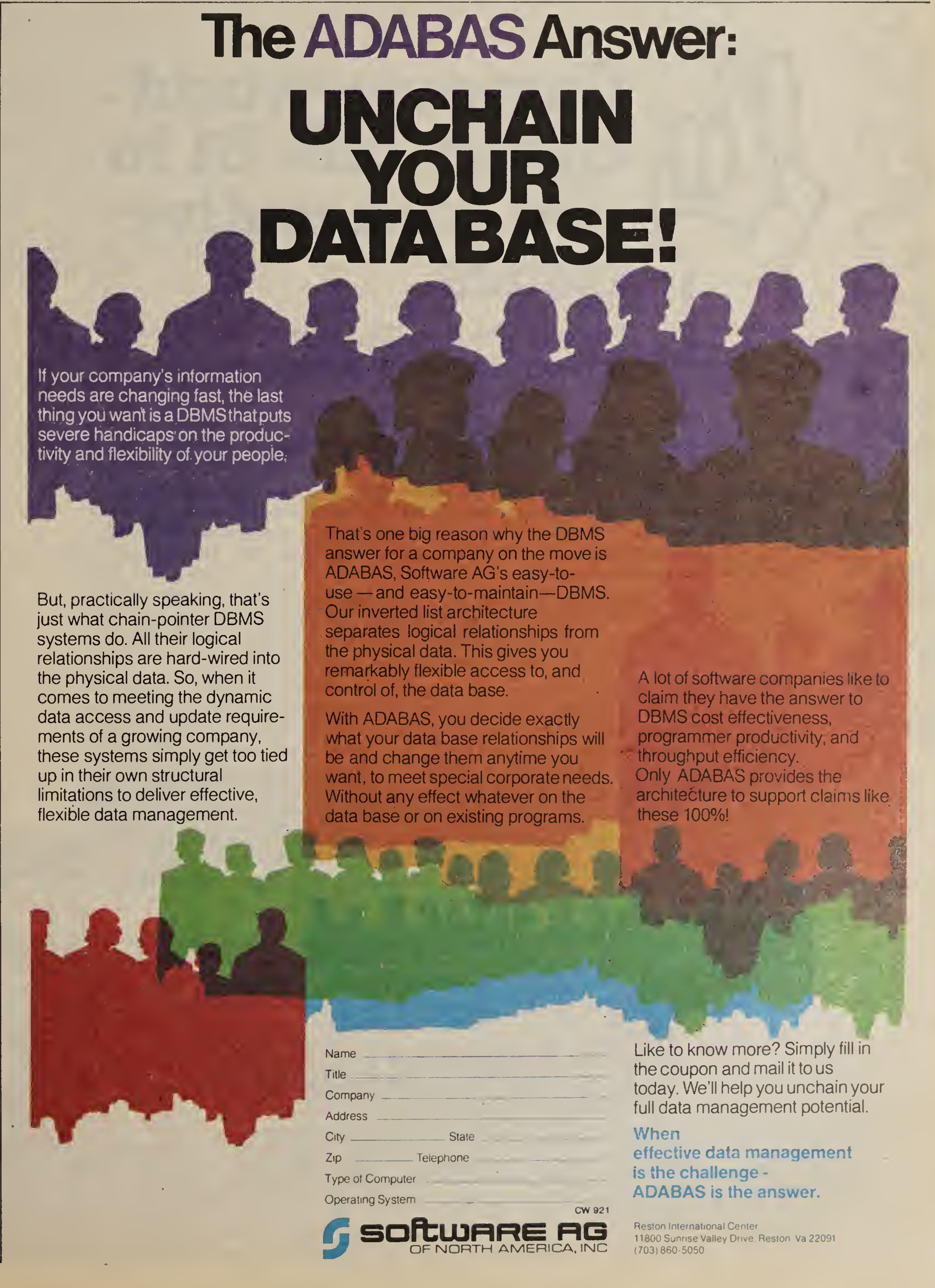

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example of this type of measure.

6. Management measures. Soft data measurement is also important, such as user feedback (positive or negative), so concentration on service level measurement is important.

- **Executive information systems (EIS).** For the past 20 years, we have been automating clerical functions. It is time to put computers to work for managers. More management systems are needed to lead managers to better decisions, better control over their activities and better individual and company performance. Management systems require tailoring information to the specific needs of individuals and then making that information easily accessible.

A useful strategy for the former is the "critical success factor method" and for the latter, "customer information centers":

1. Critical success factors depend on the use of interview sessions with top executives to focus on the few key areas of the business where things must go right. The reader is referred to the April 1979 issue of the *Harvard Business Review* for a description of this methodology described by Jack Rockart of MIT: "Critical success factors are, for any business, the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization. They are the few key areas where 'things must go right' for the business to flourish. If results in these areas are not adequate, the organization's efforts for the period will be less than desired."[10]

2. Customer information centers in user areas can provide easy access to data, once the data base is established using the CSF method. Users can be easily trained to retrieve data through their terminals using a high-level query/report generator language. A graphics package is also useful for executive analysis.

We have suggested that the evolution from data processing to information management will represent new opportunities for today's DP/MIS managers to logically extend their career paths to become the information resource managers, or chief information officers, in the future firm. In a recent article in *Computerworld*, Jake Kirchner stated: "With the growing importance of information, the person who controls these resources will obviously have considerable influence on the organization's future. In this environment, DP professionals have a leg up, IRM proponents claim, because they have a basic understanding of and appreciation for the value of information."

We believe that the experience-based management style of the past will give way to more research-based management in the information age ahead. Information resource managers, by exchanging their technical cloaks for business suits, will have greater opportunity to increase their influence and effectiveness in the organization and bring information management to maturity in the '80s as a vital corporate asset.

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About the Author

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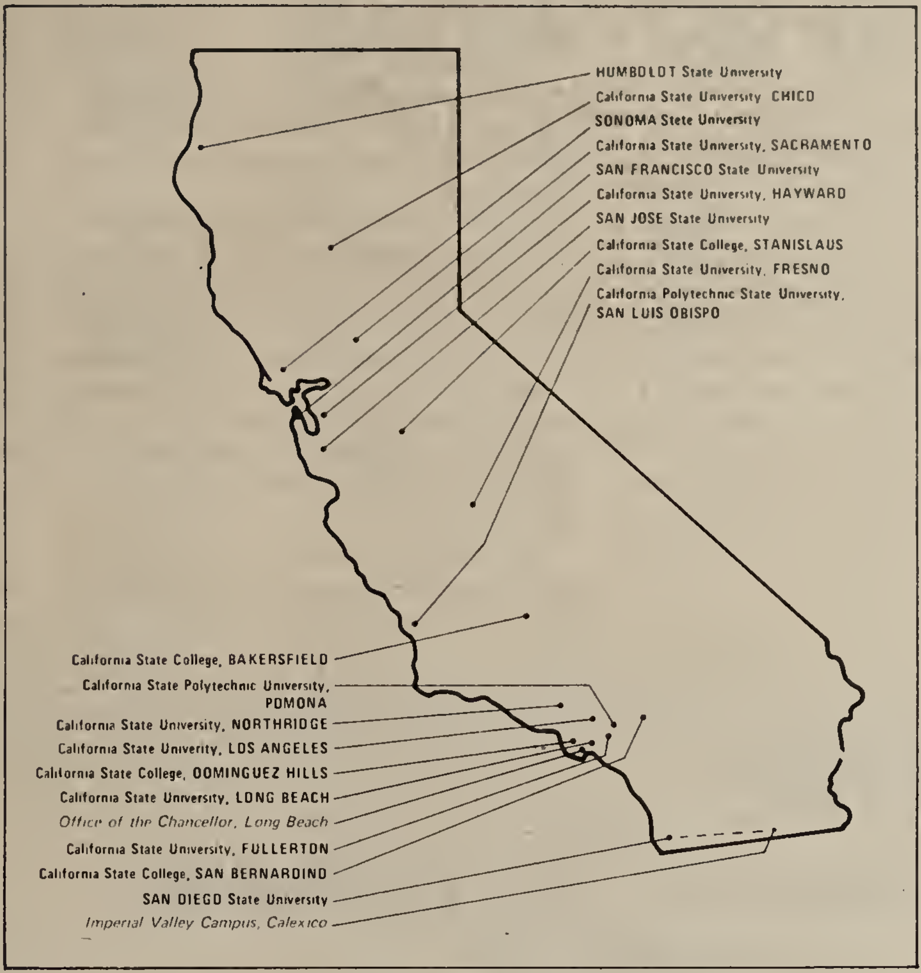
$50 Million Network

One CPU to Unite 19 California Colleges

LOS ANGELES — Nineteen colleges and universities in California's higher educaton system will be linked to a main processor here in what some are calling the largest distributed processing project ever undertaken by an academic institution.

Comprised of 21 Control Data Corp. Cyber 170 series 700 processors, the $50 million network will be in place by next year when each of the branch processors is linked to the state university data enter here.

The data center will install a Cyber 730 dual processor and a Cyber 760. The 19 campuses will have either Cyber 720, 730 or 750 processors installed, CDC said.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SAN DIEGO State University
Imperial Valley Campus, Calexico

The California State University and Colleges

Shared Resources

With the combined resources of the local and remote processors, CDC claimed the university system will be able to beef up course offerings at each campus and eventually the system will allow the university system to share resources with other universities outside the state.

The system is managed centrally through the Division of Information Systems in the univesity's chancellor's office.

Responsibilities for that office include managing and operating a central batch and timesharing computer center, preparing and coordinating systemwide budget requests and procurements, reviewing, analyzing and coordinating all DP activities, coordinating software development and supporting the chancellor's office DP requirements, CDC said.

The development of the CSUC system was divided into three basic stages, each characterized by different types of DP applications. The integration stage, which started in 1975 when the university business offices, student records and curriculum departments were faced with limited interactivity among other universities in the state college system.

The school system wanted to introduce microfilm listings of library holdings and a personnel list. However, state administrators also wanted to evaluate how computers could be used to improve communications among the schools.

In August 1979, the college system requested bids for a system to link the 21 campuses with the central computing facility in the Los Angeles-based chancellor's office.

For a vendor to qualify, it had to process benchmark scripts that reflected the current and projected work loads for each campus and the Los Angeles data center.

In addition, the computer system had to be capable of sharing computer resources with some 40 institutions across the country. As a result, the winning bid had to be able to deal with a 40-system network that could process more than 200 benchmark scripts, according to Chancellor Glenn S. Dumke.

When fully installed, the system will be able to support multiple programming languages including Cobol, Fortran, Algol, Pacsal APL and PL/I. In addition, users will have on-line access with interactive software and continuous system simulators used to analyze environmental phenomena and dynamic systems in science and engineering programs will also be provided.

General-purpose systems simulation software is also provided for business and transportation simulations, CDC said.

(Continued on Page 70)

Features Local Forms Cache

HP Enhances 2624B, Maintains Price

PALO ALTO, Calif. — Hewlett-Packard Co. has announced an enhanced version of its HP 2624B data entry terminal that features a local forms cache, multipoint data communications and enhanced data entry features. However, the firm did not change the price on the units.

The local forms cache accepts forms downloaded from the system into off-screen memory. Forms needed for a work session can be stored locally in the forms cache and transferred to the screen as needed, HP explained.

Multipoint and point-to-point data communications are both supported. In multipoint, both asynchronous and synchronous operations are supported. The unit supports the RS-232C interface to both a computer and printer, according to a spokesman.

Data entry features include support for protected, unprotected and transmit-only fields along with other local data checking features and format operations, according to the vendor.

The terminal costs $2,890. An optional integral thermal printer costs $1,210, the vendor said from 1820 Embarcadero Road, Palo Alto, Calif. 94303.

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Datapoint Adds Print Options

SAN ANTONIO, Texas — Datapoint Corp. has announced an expanded print option for its 160 char./sec matrix printer.

Available Oct. 15, the option is offered as an add-on feature for Datapoint's Model 9621 and 9622 matrix printers. It can be ordered on new printers or installed as a field upgrade, the vendor said.

The option allows the user to invoke additional printing options through software control from a terminal. Users can select variable spacing values. The option costs $200 plus $3/mo for maintenance. Lease prices are also available, the vendor said from 9725 Datapoint Drive, San Antonio, Texas, 78284.

CAD System Runs PC Design

CONCORD, Calif. — Nicolet CAD Corp. has announced a monochromatic raster computer-aided design (CAD) system for printed circuit (PC) design.

Called the System 60, the unit is based on a dual processor design. Features include a 23-in. display, the ability to select 13 discrete levels of varying intensity and distinguish layers of a printed circuit board and the ability to program the pan area to the proportion of a printed circuit board measuring up to 218 sq in. on a 1:1 ratio.

The system costs about $45,000, the vendor said from 2450 Whitman Road, Concord, Calif. 94518.

Full-Color Imaging System Released for CAD by AED

SUNNYVALE, Calif. — Advanced Electronics Design, Inc. (AED) has announced a full-color imaging display system for computer-aided design (CAD) and process control applications.

The AED512R, which basically consists of a keyboard and controller, can function as a telecommunications terminal or computer peripheral. As a terminal, the system communicates serially via an RS-232C or current loop interface while as a peripheral it operates by command of a computer under direct memory access control.

The display system is compatible with Digital Equipment Corp. VAX, PDP-11 and LSI-11 computers; Data General Corp. Nova and Micronova machines; and a variety of other processors, a spokesman said.

The imaging system can handle 256 of 16.8 million colors simultaneously, along with three-dimensional shading and color blinking. The system also highlights important CAD or process control information on the user's viewing screen.

The system incorporates the firm's Superoam software, which allows users to pan over a stored large drawing and view drawings and zoom in on specific regions.

Finally, in its direct memory access mode, the system is reportedly ably to transfer data at 1M byte/sec, enabling complete data transfer to or from the terminal in less than a second, he claimed.

The system costs less than $20,000. AED is located at 440 Potrero Ave., Sunnyvale, Calif. 94086.

One CPU to Tie 19 Campuses

(Continued from Page 69)

Some graphics systems at various member campuses are also tied into the system. However, Thomas West, director of the Division of Information Systems, said the college system is looking into the possibility of developing a computer-aided design package to be used on the system. West added the school system is also considering installing CDC's Plato computer-aided education system.

All but two of the processors in the network have been installed. Systems in San Diego and San Jose, Calif., are awaiting new buildings before they can be installed, West said. The 19 campuses are linked with the central computing facility in Los Angeles via a network the university system developed in-house. Those systems are expected to be installed in the next few months.

As in similar distributed systems, each university uses its processor to handle local duties. The systems also have the capability to access data stored at other campuses. However, West said the current configuration requires each campus to make requests for off-campus information through the central computing center.

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FEATURE COMPARISON CHART

FEATURE	Visual 400	Lear Seigler ADM-42	Perkin Elmer 1251	ADDS Regent 60	Hazeltine Executive 80, Model 30	Beehive DM30
ANSI X3.64 Specified	STD	**NO**	**NO**	**NO**	STD	**NO**
Set-up Modes Eliminate External Switches	STD	**NO**	STD	**NO**	**NO**	**NO**
Typomatic Solid State Keyboard	STD	**NO**	**NO**	**NO**	STD	**NO**
Detached Keyboard	STD	STD	**OPT**	**NO**	STD	STD
CRT Saver	STD	**NO**	**NO**	**NO**	**NO**	**NO**
Block or Underline Cursor	STD	**NO**	STD	STD	STD	**NO**
80 and 132 Columns	STD	**NO**	**NO**	**NO**	**OPT**	**NO**
Double Size Characters	STD	**NO**	**NO**	**NO**	**OPT**	**NO**
Smooth Scrolling	STD	**NO**	**NO**	**NO**	**OPT**	**NO**
Horizontal Split Screen	STD	**NO**	**NO**	**NO**	STD	**NO**
Video Attributes Require No Display Space	STD	**NO**	**NO**	**NO**	STD	STD
8 Area Qualifications	STD	**NO**	**NO**	**NO**	**NO**	**NO**
8 Resident Nat'l Char. Sets Including Line Drawing	STD	**NO**	**NO**	**NO**	**NO**	**NO**
Programmable Non-volatile Function Keys	STD	**OPT**	STD	**NO**	**NO**	**NO**
Display of ALL Control Codes	STD	STD	STD	STD	**NO**	STD
Insert Delete Line with Push Up or Down	STD	**NO**	**NO**	**NO**	**NO**	**NO**
Insert Delete Character with Push Right or Left	STD	**NO**	**NO**	**NO**	**NO**	**NO**
Select Editing Extent to Field, Area, Line, Page	STD	**NO**	**NO**	**NO**	**NO**	**NO**
20 mA Current Loop	STD	STD	**OPT**	**OPT**	**OPT**	STD
Programmable Message Framing (non-volatile)	STD	**NO**	STD	**NO**	**NO**	**NO**
Programmable Answerback	STD	**NO**	STD	**NO**	**NO**	**NO**
Baud Rates to 19200 BPS	STD	**NO**	**NO**	**NO**	STD	STD
Independent Xmit/Receive Rates	STD	**NO**	**NO**	**NO**	**NO**	**NO**
Printer Port Independent of Communication Interface	**OPT**	**OPT**	STD	STD	**OPT**	STD
Paging	**OPT**	STD	**NO**	**NO**	STD	STD

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In Sixth Annual MIC Survey

Users Give Vector Graphics Top Marks

By Tim Scannell
CW Staff

System	Respondents	Performance	Reliability	Ease-of-Use	Service	Support
Vector Graphics VIP	5	3.8	4.0	4.0	4.0	4.0
Vector Graphics B	6	3.7	4.0	3.7	3.7	4.0
IBM 5110/5120	13	3.5	3.8	3.8	3.7	3.0
Apple II Plus	17	3.7	3.6	3.5	3.5	3.2
IBM System/34	21	3.6	3.7	3.5	3.3	3.2
IBM System/32	17	3.7	3.4	3.1	3.5	3.4
Data General Nova 3	6	3.8	3.7	3.5	3.0	3.0
Alpha Micro	6	3.2	3.2	3.6	3.4	3.5

Shown above are the top eight small business systems that received a 3.0 average or better with a minimum of five user reponses in MIC's Small Business Computer Users Survey.

CHERRY HILL, N.J. — Vector Graphics, Inc.'s VIP and Model B computers received top marks from users in Management Information Corp.'s (MIC) sixth annual Small Business Computer Users Survey.

Rated on a scale of 1 (poor) to 4 (excellent), the two Vector Graphics computers received scores of 3.7 or better in the categories of performance, reliability, ease-of-use, service and support. The computers beat all other machines listed in the survey with a minimum of five user responses.

The overall winner, although there were only two user responses, was Rexon Business Machines Corp.'s small business computer, which received a perfect score in each of the four categories.

This year's MIC survey involved 474 companies using more than 600 small business computer systems. As part of the survey, users also rated 956 peripheral devices and 245 software packages.

Subjective Ratings

As in previous years' studies, users were asked to subjectively rate their computer systems with regard to performance, the user's expectations relative to vendor claims; reliability, uptime and downtime; ease-of-use, the amount of time taken to train new personnel; and service and manufacturer support, which encompasses maintenance, training and program assistance. However, unlike previous surveys, MIC only used results accummulated from the 1981 responses. Prior to this year, the research firm added recent results to those of past surveys to arrive at a final standing.

In all, eight computer systems with a minimum of five user responses made MIC's 3.0 average or better the "winner's box" this time around.

These olympian systems in order of victory were Vector Graphics VIP and Model B with cumulative point scores of 19.8 and 19.1, respectively; IBM's 5110/5120, with an average of 17.8; Apple Computer, Inc.'s Apple II Plus, with a 17.5 average; IBM's System/34, with a 17.3; IBM's System/32, with a 17.1; and Alpha Micro, Inc.'s small business system, with a 16.9 average score.

On the other hand, systems that apparently did not meet with all of the users' expectations included Sperry Univac's V-77, whose one respondent gave it a 1.0 in perfoemance; the Apple III, that also got a 1.0 from one user; and Burroughs Corp.'s B-800 computer, that fared a 2.5 on the performance scale.

In the peripherals portion of the survey, three terminals out of the more than 25 included in the report rated tops with perfect scores in performance, reliability and ease-of-use, the report noted. These three were Applied Digital Data Systems, Inc.s' (Adds) Model 100, Digital Equipment Corp.'s VT 100 and Volker Craig, Ltd.'s Model 404.

Also receiving perfect high scores in the same three categories were Micro Modern, Inc.'s and Texas Instruments, Inc.'s Model 50 disk drives, Digital Equipment Corp.'s LA-120 NEC and Information Systems, Inc.'s Model 5530 printers.

The highest rated software program, with more than 20 user responses, was Personal Software, Inc.'s Visicalc microcomputer-based forecasting package, the report said.

In conclusion, the report pointed out that although there are more and more business systems being installed, service and support — as shown by their low scores — continue to be nagging user problems. While users are basically pleased with their present systems, about 40% of the respondents anticipate the addition of another system or more equipment within a year.

MIC is located at 140 Barclay Center, Cherry Hill, N.J. 08034.

Lanier's First Small Business System Doubles as Low-End Word Processor

ATLANTA — Lanier Business Products, Inc. has entered the small business computer market with a desktop system that doubles as the company's low-end word processor.

Available with 96K- to 256K bytes of random-access memory, the Z80-based system known as Computereze is targeted against the IBM Displaywriter, as well as IBM's System/23, Burroughs Corp. B90 and NCR's 9100, a company spokesman stated.

It is aimed at small businesses with $250,000 to $25 million in annual sales and is not intended as a personal computer, a spokesman stated.

The system includes a 27-line by 80-col CRT display with detachable keyboard, 5¼-in. floppy disks or optional Seagate 5¼-in. Winchester 5M-byte drives and costs $7,495, the vendor said. The same processor can be ordered as EZ-1, which includes a 43-char./sec. daisy wheel printer and costs $5,995. Most of the software for the two versions is priced separately, the vendor said.

The 96K-byte Computereze includes two 600K-byte minifloppy disks, an 80-char./sec Epson printer and uses a proprietary operating system similar to the Bell Laboratories Unix operating system. Seven Lanier-developed standard business application packages are supported that cost $1,400 each, but are discounted in multiples so that it would cost $710 each if all seven packages were ordered.

A more advanced Computereze model with a Winchester disk drive and a 132-col, 50 char./sec printer costs $11,495.

The systems were developed at Lanier and will be manfactured by the company. Previously, Lanier had sold systems manufactured for it by AES Data Ltd. of Montreal.

A separate direct sales force under the direction of Lanier's field sales organization and operating out of the company's headquarters will market the Computereze system, which can also be ordered with the EZ-1 word processing software.

The EZ-1 configuration price of $5,995 includes 96K bytes of memory, a single-sided 140K-byte minifloppy and a Ricoh-built 43 char./sec printer.

A basic text editing package with a choice of list merge or auto pagination routines costs $15/mo or $563 on a five-year license. A high-end version is also available for $10,495.

Lanier is located at 1700 Chantilly Drive, N.E., Atlanta, Ga. 30302.

Findex Adds Portable MPU

TORRANCE, Calif. — Findex, Inc. has developed a 31-lb, terminal-size microcomputer that combines memory, keyboard, display, disk drive and printer in a portable unit featuring a memory capacity of up to 2M characters on minifloppy diskette drives.

The Findex supports Business Basic, Cobol, Fortran, Pascal, APL and PL/I. Applications software is available from the firm.

The system, operable on 110-, 220- or 12 volts, ranges in price from $6,980 to $20,000 from the firm at 20775 S. Western Ave., Torrance, Calif. 90501.

Printer Emulates System/34's 5256

HORSHAM, Pa. — A remote line printer that is said to emulate the IBM 5256 printer on the System/34 has been introduced by Decision Data Computer Corp.

The Model 6665-12 printer reportedly features operator convenience, fully formed characters and IBM system compatibility.

Available for delivery in 90 days, the unit costs $16,000 from the firm at 100 Witmer Road, Horsham, Pa. 19044.

Mini Bits

Controller Out for Q-Bus

CARSON, Calif. — Decade Systems, Inc. has announced a line printer controller for Digital Equipment Corp.'s Q-Bus.

The DLP11-Q controller operates with all printers using industry standard interfaces. Features include installation without switches or jumpers and full software compatibility, the vendor said.

The unit costs $350. Decade Systems can be reached through P.O. Box 5369, Carson, Calif. 90749.

Matrix Offers RAM Card

RALEIGH, N.C. — Matrix Corp. has announced the 7911/RPC, a random-access memory (RAM) program card that features up to 32K bytes of addressable RAM storage in independent 4K-byte blocks.

Two cards can be used to provide a full 64K-byte memory. The cards are configured in a jumper option that allows two or more cards to be attached in a multimapped system, the vendor said.

Prices range from $170 to $490 each, depending on the configuration. More information is available from the vendor at 1639 Green St., Raleigh, N.C. 27603.

Drive Boasts IBM/Ansi

MOUNTAIN VIEW, Calif. — A nine-track tape drive featuring an IBM/Ansi standard format has been introduced by Cromemco, Inc.

The system is said to offer users a means of data backup, archival storage and data exchange with other IBM/Ansi standard systems using the 1,600 bit/in. format, the vendor said.

The tape drive and intelligent controller, which can store more than 40 million bytes on a reel of tape, can read, write or search at tape speeds of 25- and 100 in./sec without intervention from the host CPU, according to the vendor.

The tape system including transport, formatter, intelligent controller and cables costs $7,995 with deliveries starting in November.

More information is available from Cromemco at 280 Bernardo Ave., Mountain View, Calif. 94043.

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Intel would like to give

With light-speed paging and swapping, Intel's new FAST-3815 intelligent memory system frees your 3350s (and 3380s) for the task they were meant to perform: data storage.

Priced at only $6K a megabyte, the FAST-3815 is an intelligent Random Access Memory (RAM) *system*. And because it handles paging and swapping faster and more economically than anything else in the market, the FAST-3815 releases your large capacity disk drives for productive use.

When compared to conventional disks, Intel's FAST-3815 offers many cost-effective advantages for IBM 4300, 158, 168, 303x and PCM users. These include:

- Improving paging and swapping up to 300 percent,
- Enhancing systems performance by reducing page service time up to 67 percent (vs. a 3350),
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Intelligent memory priced at $6K a megabyte

You won't find RAM memory anywhere priced as low as $6K a megabyte...especially *intelligent* RAM memory. Intel's advanced iSBC 86/12™ single-board computer equips the FAST-3815 with unparalleled intelligence that, among other functions, handles channel protocol and performs sophisticated self-healing diagnostics.

Self-healing procedures which make the FAST-3815 virtually fail-safe include:

- The first commercial application of 'hot' spares and double-bit error correction with multiple-bit detection,

Laredo Offers 5M-Byte System

SAN JOSE, Calif. — Laredo Systems, Inc. has announced a 5M-byte memory system.

The LS525 incorporates a Seagate ST506 5¼-in. Winchester disk drive, the LDOS disk operating system from Logical Systems, Inc. and a power supply from Microcomputer Power Supply, Inc. Laredo's LSI 500 series controller is also included in the package, according to the vendor.

All TRS-80 user programs currently running under the TRSDOS or NEWDOS operating systems will run under LDOS, the vendor said.

The unit costs $3,750, the vendor said from 2264 Calle De Luna, Santa Clara, Calif. 95050.

Memory System Out for PDP-11

WESTLAKE VILLAGE, Calif. — A dynamic memory system designed for operation with the Digital Equipment Corp. PDP-11/23 is available from Chrislin Industries, Inc.

The CI-1123 memory is said to place 256K bytes of memory on a single dual-width board, which replaces the need for the standard four dual-width board used for populating a PDP-11/23 with its full complement of memory. The memory costs $1,550 in a 128K-byte option and $1,925 for the 256K-byte option, Chrislin said from No. 102, 31352 Via Colinas, Westlake Village, Calif. 91361.

MSC Expands Model 1990, Unveils Storage for HP

SUNNYVALE, Calif. — Microcomputer Systems Corp. (MSC) has expanded its Model 1990 SMD Disk Controller and has introduced mass storage for Hewlett-Packard Co. desktop computers.

The 1990 disk controller — designed to control up to three high-density cartridge module-type disk drives on the Texas Instruments, Inc. TI-990 computer — can now be used for Control Data Corp.'s SMD and MMD 80M-, 160M- and 300M-byte disk drives and Century Data Systems, Inc.'s SMD 80M- and 300M-byte disk drives.

The disk controller costs $3,700.

For users of HP personal computers and other IEEE 488 bus-based systems, the firm has introduced the 9800 series 5M-byte Winchester Disk Storage Subsystem. It is said to be one-fourth the size, one-third the weight and one-third the cost of a floppy disk system with equivalent storage capacity.

The 9800 series costs less than $4,000 from the firm at 432 Lakeside Drive, Sunnyvale, Calif. 94086.

Dip Introduces Impact Printer For Heavy Use

BOSTON — A dot matrix impact printer designed for continuous duty cycles in such applications as CRT terminal dump for hard copy as well as small business, industrial and laboratory activities has been introduced by Dip, Inc.

The Dip-81A features 7-by-7 or expanded 14-by-7 matrix printing, an uppercase and lowercase character set and a bidirectional printing speed of 100 char./sec.

The unit comes with a standard 10-line and optional 2K-byte buffer and uses ordinary bond paper in sheets, rolls or fanfold form, the vendor said.

With its full 96-char. Ascii set, the printer is reportedly capable of uppercase and lowercase printing at both 40- and 80 char./line. Operator features include power-on, line-feed, top of form and self-test.

A Centronics Data Computer Corp.-compatible parallel interface is standard with the unit and serial RS-232C or 20mA current loop interfaces are optional.

The Dip-81A costs $499. OEM discounts are available from the company at 745 Atlantic Ave., Boston, Mass. 02111.

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The FAST-3815's microcomputer also ensures complete IBM compatibility and the ability to emulate numerous direct access storage devices.

Fast access
The FAST-3815's extremely fast paging and swapping performance can release 3350s (and 3380s) to perform the function they handle best—normal data storage. The FAST-3815's 0.8 milliseconds access time is considerably faster than any IBM alternative.

By moving the paging data sets of swap files onto a single FAST-3815, you can free *multiple* 3350s (and 3380s) to handle your growing data storage requirements. And, Intel's FAST-3815 is available for delivery *now*.

The FAST-3800 family
The new FAST-3815 is an entry-level version of the Intel FAST-3805 semiconductor disk. Both devices in the FAST-3800 family offer impressive environmental savings. Power costs, cooling costs and space requirements are at least half of those of conventional disks.

Intel's FAST-3815 releases your disks for more productive use, offers increased systems performance, and is available *now*. Interested? Contact Intel's Market Information Office at 512/258-5171. Or mail the attached coupon today.

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Honeywell

Tabletop CPU, Terminal Announced by Datapoint

NEW YORK — Datapoint Corp. has pushed further into the office equipment marketplace by announcing a tabletop computer and a terminal, both designed for comfortable office use.

Operator comfort — the objective of what vendors call ergonomics — will be a high-priority consideration of the product family Datapoint recently launched with its Model 8600 tabletop system and Model 8220 terminal, a spokesman vowed.

The 8600 features a 20M-byte fixed disk drive and capacity for up to 256K bytes of main memory.

The system was called fully compatible with Datapoint's Attached Resource Computer (ARC) in a local network, but it can also stand alone. Under the vendor's Resource Management System (RMS) software, 8600 users gain "full multiprocessing," the spokesman claimed.

With RMS, he explained, Cobol applications, word processing, data entry and electronic mail can proceed simultaneously.

System Features

The 8600 features a 12-in. diagonal screen with 24 lines of 80 characters displayable in amber. Operators can select from 16 screen brightness levels, the spokesman said.

The keyboard is detachable and the processor's chassis can tilt or rotate with an option.

The 8600 is available with a new Model 9301 disk unit that stores 20M bytes on a stack of 5¼-in. platters. Extension units permit a maximum storage capacity of 100M bytes, the spokesman added.

Within the 9301 housing, a cartridge tape drive exists to transfer data from an entire disk to a single ¼-in. tape. In this way, an entire disk unit can be backed up in about 12 minutes, the spokesman asserted.

The 16-bit Model 8600 comes in four versions: the 8601, with serial port for printer or terminal plus an ARC processor; the 8602, with options for modem and peripheral interfacing; the 8620, which supports up to 40M bytes on disk; and the 8630, which supports up to 100M bytes on disk.

The 8602, 8603, 8620 and 8630 tabletop systems cost $7,500, $10,950, $28,500 and $33,500, respectively. Leasing is available.

As for the 8220 nonintelligent terminal, its amber 1,920-char. screen divides into "windows." This permits a menu, guiding the office worker through procedures, to be displayed in one portion of the screen while the rest is employed dynamically, the spokesman explained.

The ARC-compatible 8220 can be rented for $88/mo, or leased for $70/mo. Datapoint is headquartered at 9725 Datapoint Drive, San Antonio, Texas 78284.

The Xerox 515

Xerox Adds 515 System With 1G Char. Storage

DALLAS — Xerox Corp. has introduced a small business computer system for office applications that features up to 1G char. of both removable and fixed disk storage.

The Xerox 515 is a microprocessor-based computer with 64K char. of random-access memory; a CRT display; two disk storage units — one fixed, the other removable; a keyboard and a choice of optional daisywheel or matrix printers. All components except the keyboard and printer are housed in a single desktop cabinet, a spokesman said.

The system includes an operating system, a general-purpose applications compiler, advanced business language and a variety of utility software packages. Optional programs include a word processing package geared to handle long documents, such as legal briefs, the spokesman noted.

Typical Users

Typical users of the system include retailers, manufacturers and professional offices, the vendor said.

The system's removable disk stores 1.25M char. of information while the fixed drive has a formatted capacity of 8.4M char. The 12-in. CRT display shows 24 lines of 80 char. and can be reversed, showing either

(Continued on Page 62)

CW at DPMA Office Automation Symposium

Manager's Role in Automation Explored

By Ann Dooley
CW Staff

CHICAGO — A little knowledge is a dangerous thing to users who are considering office automation.

The non-DP manager doesn't need and undoubtedly has no desire to learn how technology actually works. Rather, managers want to see the results automation can bring to their organization — sometimes a difficult task, according to Richard Barber, vice-president of Government Counselling Ltd., Alexandria, Va.

Speaking at the Data Processing Management Association's (DPMA) Second Annual Symposium on Office Automation, Barber told a group of 175 users, prospective users and implementors of the new technology that a manager should determine what needs the system can fill on an organizationwide basis and then work with the computer staff to provide those services. According to Barber, programming done by users occurs on a limited basis, but is far from being a viable feature in most organizations.

The attendees who assembled in Chicago shared a common goal — discovering what the new phenomenon of office automation is all about and whether it will be feasible for them. Most are at very rudimentary stages of automation with word processing facilities, but little beyond. Electronic mail, teleconferencing and inter- and intraoffice communications networks are concepts that they want to implement, but at this point in time they are looking, first, for basic information about the concepts and, second, for ways to justify them to top management.

According to Barber, the functional elements of office automation break down into five categories: creation, manipulation, expansion, distribution and storage.

(Continued on Page 77)

Electronic Mail: Executives Say Interest — Not Use — Growing

By Ann Dooley
CW Staff

CHICAGO — Electronic mail is a concept waiting for its time to come.

The technology is rapidly moving into place. The number of users interested in electronic mail is large and growing, but that is where it stops.

Users are not yet ready to implement electronic mail services and are still in the learning stage — trying to determine what electronic mail encompasses, the differences between intradepartment, local area and long distance networks and what electronic mail can offer their organizations.

At the Data Processing Management Association's Second Annual Symposium on Office Automation, held here recently, several speakers discussed these topics before an audience of potential users and implementors of electronic mail.

Raymond Wenig, president and technical director of International Management Services, Inc. of Framingham, Mass., told an audience that computer-based message systems (CBMS), in particular, reduce the need for head-to-head meetings, create interruption-free periods, eliminate call-back syndrome and place problems into a format that allows users to rank them as to importance.

On the other hand, a CBMS creates com-

(Continued on Page 76)

Electronic Mail: Interest — Not Use — Growing

(Continued from Page 75)

munications that is noninteractive, comes up against the reluctance of managers to use such a system and the fact that many people have trouble communicating in text and also that it may have a dehumanizing effect.

While the term electronic mail itself is used because it makes the concept easier to conceptualize, the technology will eventually include more than electronic messaging: procedures/reports, text preparation, personal work support, data access and others.

Before implementing electronic mail, Wenig advised instituting a feasibility study that should concentrate on data collection, technology evaluation, requirements definition, alternative analysis and management report.

According to Wenig, the best way to plan for a system is to first plan several alternatives, evaluate their differences and then choose a specific approach. A pilot installation of electronic mail is the best method for a first-time user, the audience was told. Starting on a small term will enable an organization to gauge user acceptance, gather user data and refine the system. It also makes it easier to go back to the drawing board if it proves unsuccessful, Wenig noted.

The pilot must be accessed by at least 80% of the selected user group to be fully utilized. It should be organized by a task force with central authority and should not last longer than six months, unless initial start-up problems are encountered.

Good user interface is critical to the success of both the pilot and the overall system. Training time will be reduced, user satisfaction will increase, as will speed and use, and fewer conceptual problems will occur if the users are taught to feel comfortable with the system.

Although electronic mail-type systems such as facsimile, CBMS and verbal store/forward systems can be cost justified, difficulty arises with more sophisticated systems, Wenig warned. Tangible costs that cover postal service, salaries, physical space, equipment and time may be able to be shown to top management. But intangible costs may occur in productivity, faster message/decision making, more efficient time management and phone call replacement, which are more difficult to assess.

Management resistance is not the only factor to overcome, Wenig indicated. User resistance is an obstacle that must be overcome to make the system viable. He advised that one should know how to sell the system to users, build up the system internally, install the system gradually, have sufficient training periods, offer on-site support and, most critically, gain top management support.

In addition to selling managers and users on the system, several problem areas currently exist in the hardware and software itself, according to Wenig. Compatibility among vendors that would enable interconnection and resource sharing does not exist, software needs to become more flexible and vendor service and support is still spotty in remote areas, Wenig noted. Also, physical security is compounded in a distributed environment, software tools to limit access are often limited and management and control problems are still surfacing.

John McQuillan, president of BBN Information Management Corp. of Cambridge, Mass., told attendees that a CBMS can save up to an hour a day by reducing wasted time, reducing interruptions and clerical effort by professionals.

According to McQuillan, only 28% of phone calls are completed, but 100% of messages would be and while phone calls last an average of nine minutes, a CBMS transmission can be completed in three minutes. A CBMS can also reduce interruptions/restarts by 60 minutes a day and reduces professional time spent on clerical tasks by 30 minutes a day, McQuillan said.

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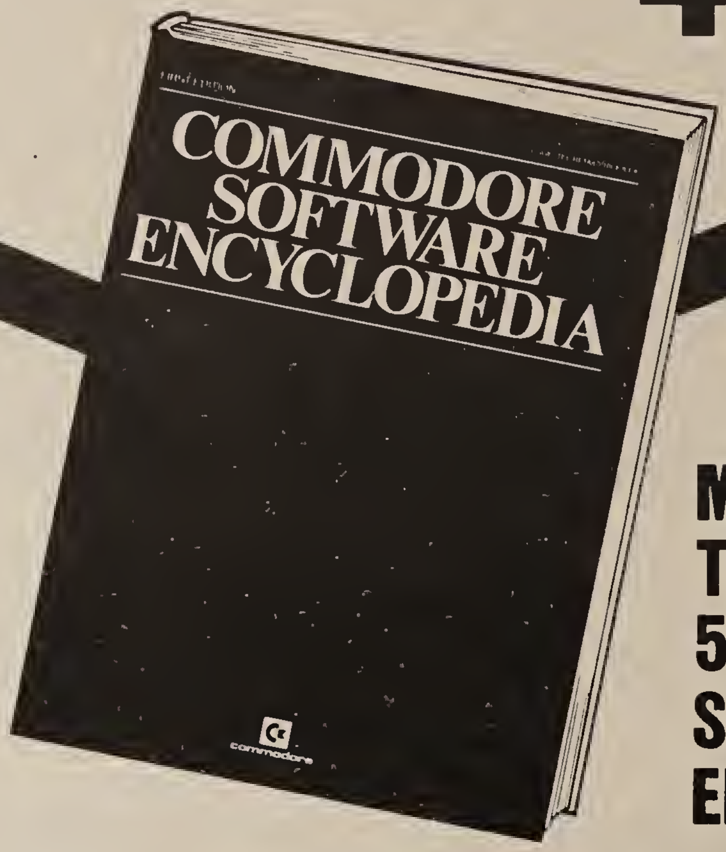

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Xerox Releases 515 System

(Continued from Page 59)

dark text on a light background or light characters on a dark background. It includes half-density and blinking under program control, the spokesman added.

The unit's detached keyboard includes a numeric pad with double-zero, decimal point and comma, programmable function keys and separate cursor control keys, in addition to the standard typewriter layout.

Finally, an optional peripheral interface unit is available with the 515, providing synchronous or asynchronous communications with other computers and up to four CRT or hard-copy workstations, terminals or additional printers, according to the spokesman.

Available through Xerox retail stores and distributors, the system costs less than $13,000 without printer. Purchase price includes the operating system and utility software, the spokesman said from the firm's Office Products Division at 1341 W. Mockingbird Lane, Dallas, Texas 75247.

Barber Explores Manager's Role

(Continued from Page 75)

Any application that is implemented in any of these areas falls under the umbrella of office automation, he noted.

Spiraling operational costs are just one of the factors creating a widespread demand for office automation, he told the audience. The need for accountability of work, lack of time, people problems and the need to optimize equipment use are making users look for solutions in the area of office automation. "We train DP staff and assembly line workers about their jobs, but we learn on-the-job at the office," he said. Additionally, the combination of rising office costs, lagging productivity, labor-intensive work, lack of job enrichment and haphazard applications will create a groundswell to bring automated technology to every office, he noted.

When developing strategies for office automation some guidelines to follow are:

- Build integrated systems that keep future expansion in mind.
- Build redundant systems to guard against major system downtime.
- Keep people issues paramount; giving special attention to training, job satisfaction, career opportunity and the physical office environment.

Do not get fooled into applying the "band-aid" approach, where a single-function system is acquired to patch one problem at a time. The band-aid approach can hide a dangerous infection underneath," Barber warned the group.

Noting that timely information is what office automation is all about, Barber mentioned a number of pluses that could be used to convince management of the benefits of office automation.

A well-planned system would provide increased efficiency and quality, more productivity, more interesting work, greater career opportunities and support for both the managerial and clerical functions, he noted. However, he cautioned that several of these pluses are intangible benefits, difficult to sell to management.

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'Fastext' Unites WP, Editing

GLENDALE, Calif. — Glenn A. Barber & Associates, Inc. has released an interactive full-screen text processor said to combine the features of word processors and text editors.

Fastext runs on Digital Equipment Corp.'s RSX-11 or RT-11 or S&H Computer Systems' TSX-Plus supporting VT-52 and VT-100 terminals. Fastext reportedly can run concurrently with other programs without degradation "even on small DEC LSI-11 systems," according to the firm.

Single-site licenses cost $750 for RT-11 and TSX-Plus and $950 for RSX-11M. The firm is located at Suite 304, 110 W. Broadway, Glendale, Calif. 91204.

TCS Turnkey Supports WP, Accounting Applications

HANOVER, N.H. — Time Share Corp. (TSC), a Houghton Mifflin company, has introduced a turnkey microcomputer system that can support word processing, accounting and personnel management applications.

The TSC 2308 incorporates Digital Equipment Corp.'s LSI-11/23 microprocessor and has from 128K- to 256K bytes of random-access memory. The system has eight expandable RS-232 standard serial ports and can accommodate up to eight users. In addition, the system can run DEC and non-DEC software compatible with RSTS-E, RT-11, RSX-11M, Unix and TSX+ operating systems.

The computers can be customized to fit user situations with such optional equipment as a bootstrap and clock, a 6400 bit/in. high-density tape cartridge for backup and a 20M-byte Winchester disk drive, a spokeswoman said.

The unit's card cage is hinge mounted to the power supply assembly, allowing access to system modules and the computer can be maintained under a third-party maintenance agreement offered by TSC, the spokesman explained.

The base price of the 2308 is $24,000 with substantial OEM discounts available from the firm at Dept. 138, Box 683, Hanover, N.H. 03755.

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Vendors, Implementers, Users

Three Obstacles Cited in OA Implementation

By Ann Dooley
CW Staff

CHICAGO — Three obstacles remain in implementing office information systems — the vendors, the implementers and the users.

Speaking before an audience at the Data Processing Management Association's Symposium on office automation, Michael Zisman, president of Integrated Technologies, Inc., Haverford, Pa., called office automation a third-level means to an end, improving productivity, earnings and reducing unit cost.

Zisman stated that vendors are really not sure of user requirements. They are creating some of the obstacles themselves, according to Zisman, who noted that while lack of standards among equipment manufacturers may be holding back some users, vendors do not see it in their best interests to standardize. Poor human engineering and human communication are two more obstacles. Vendors are not necessarily deceitful when they oversell a customer, he claimed, they just do not always understand the situation.

Vendors are also finding themselves leading or being pushed onto the productivity bandwagon. Needing to keep up with their competition over whose equipment will save the most time and money is an issue that is more hype than real, according to Zisman. Vendors are also seeing prices erode while at the same time having to service a growing customer base of inexperienced users who need more support.

Zisman also warned users to recognize the difference between what the vendors claim the system "can" do and what it actually does do. There can be a long distance in between, he noted.

CW
At DPMA
Symposium

Second Obstacle

The second obstacle — the implementer — serves in various roles including a gatekeeper of information, a liaison between vendors and users and as an integrator and planner. With the responsibility of being a change agent, the implementer, too, is frequently unsure of what the user needs. Sometimes even unsure of his own role, the implementer can sometimes contract the Messiah Syndrome, believing that automation will change the entire company.

Zisman said that implementers need to be reminded that companies are not in the business of installing office automation equipment, something that messiahs fail to recognize.

Other obstacles derived from the implementer include looking for the ultimate solution, not grasping the cost/benefit ratio and lacking planning expertise. Implementers sometimes fail to understand the productivity issues or the anxiety that is created when implementing change.

Some implementers think in terms of the "dumb user" or do not realize that vendors may simply be putting new names on old functions. Inexperienced implementers can also get caught up in the political warfare that occurs when treading on other manager's turf, Zisman stated.

Third Obstacle

The user or the ultimate consumer of office systems and services has highly diverse levels of exposure to technology. Obstacles encountered by users are that they are often dominated by short-term goals and earnings, they do not understand the potential of what they are getting, they do not understand the productivity and cost-benefit ratio and they want the benefits of an automated system without paying for the costs, according to Zisman.

Sometimes even the users themselves are unsure of their requirements and they limit the system by holding it back to what they perceive as possible and do not use it to the fullest extent of its capabilities.

Users also do not understand that technology is a resource that needs to be managed and they are subsequently overwhelmed by it.

Overcoming Obstacles

Overcoming these obstacles requires planning and execution. The three groups must define the scope of the system and accept their responsibility and authority. Zisman told the group that strategies — vendor, technology integration, applications, measurement, implementation, control, education and organization strategies — must be developed. The planning must be process-oriented and not product-oriented, Zisman maintained.

A great deal is expected of the implementer, according to Zisman, who noted that this person is required to be a manager of innovation, a technologist, an economist, an organization specialist, a planner, an educator and an ergonomics specialist.

Zisman told the group that the process of implementation should start with planning and include a pilot, measurement, production and integration.

Zisman stated that office automation is a process of innovation that must be managed and that it must be consistant with the organization's philosophy and risk profile.

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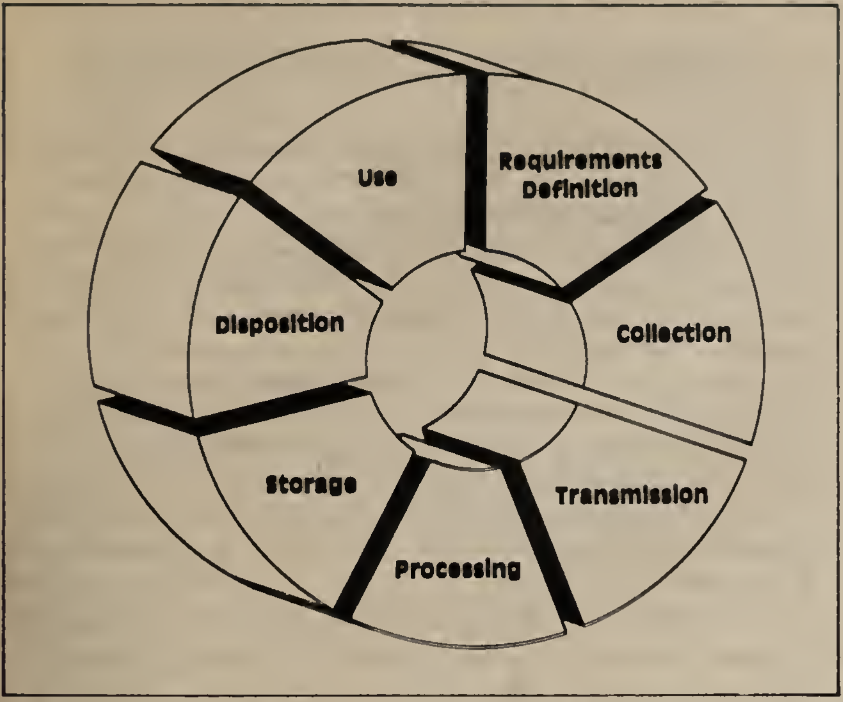
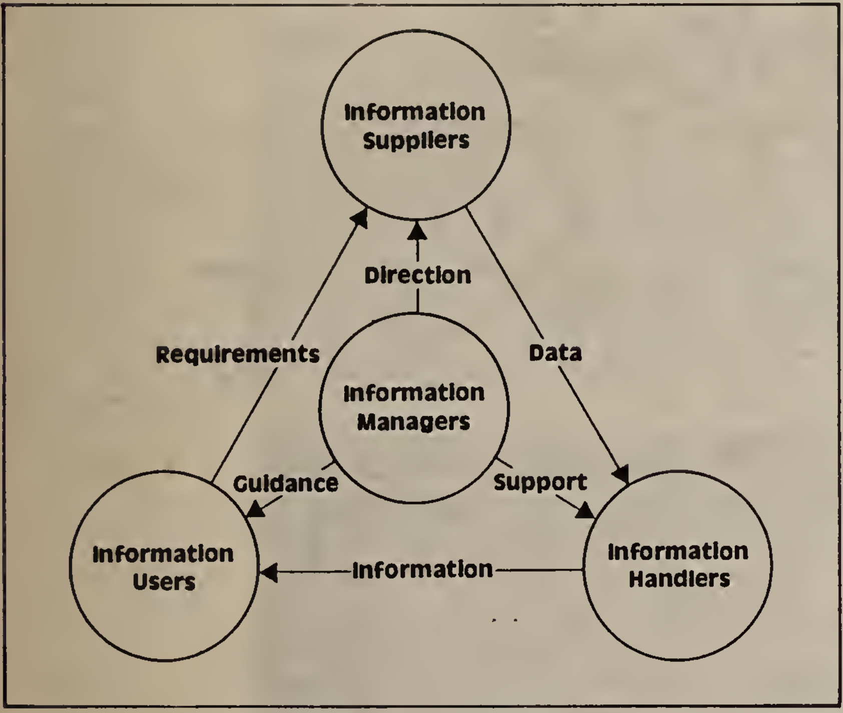


Information Life Cycle Management



Information Life Cycle

IRM Seen Way for Management To Assure Data's Corporate Value

CW at DPMA Symposium

By Ann Dooley
CW Staff

CHICAGO — Unless information can be communicated, made understandable and distributed at a reasonable cost to an organization, it is meaningless — unless management does something about it, according to Craig Cook, researcher for the U.S. federal government.

The implementation of Information Resource Management (IRM) indicates that an organization recognizes the value and cost of information and considers it a corporate resource to be improved and controlled, Cook said at the Data Processing Management Association's Second Annual Symposium on Office Automation, held here recently.

IRM involves the management of resources including integrated systems that service the entire organization's data, text, voice and image information flow.

Cook described the objectives of P.L. 96-511, a 1980 paperwork reduction law designed to minimize the paperwork burden, coordinate information policies, minimize cost while maximizing the utility of information, enhance the use of information technology and ensure information confidentiality. The law was based on the assumptions that:

- Information is a costly and valuable resource that must be managed.
- Federal information requests impose a burden on the public, particularly small businesses.
- Information technology can be used to improve federal productivity and service delay.
- Federal agencies should be held accountable for information costs, burden and technology use.

IRM implies closer coordination among existing federal information policies, tools and organizations.

Some of the provisions of the law were to establish controls over information collection, implement a federal information locator system, provide periodic reporting of agency compliance, limit exclusions or exemptions and mandate implementation steps, according to Cook.

An IRM manager's objectives should be to manage the information life cycle, assign organizational responsibilities, assist in locating information, control redundant requirements, resolve information conflicts and establish information cost accountability, Cook told the group.

In establishing an IRM, first make sure there is a need within the organization, he said. Perform an IRM concept study, determine program scope and goals and reassess the program periodically.

If there is a need, next establish information management policies and create an organizational structure for IRM such as determining an authority basis, setting standards and guidelines, centralizing policy and obtaining management commitment, Cook noted.

(Continued on Page 80)

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Basic Four Unveils Wide Printer

TUSTIN, Calif. — The Basic Four Information Systems Division of Management Assistance, Inc. (MAI) is offering a double wide printer for use with Basic Four information processing systems. The printer provides letter-quality output for the Dataword II word processing enhancement to Basic Four's computers and S80 information system.

The double wide printer is capable of utilizing the horizontal scrolling feature of Dataword II and can print documents up to 250 char. in width. It contains a print wheel of 96 char. and offers a print speed of 40 char./sec.

The printer with one 25-ft cable costs $7,500 with a monthly maintenance cost of $50. An optional feature is a forms tractor for $600.

Both models will be available Oct. 1 from the firm headquartered at 14101 Myford Road, Tustin, Calif. 92680.

CPT 8100 Goes Greek

MINNEAPOLIS — CPT Corp. has developed the capability to display and print Greek characters and mathematical symbols on the CPT 8100 word processor.

The hardware/software option can also construct, display and print complex molecular diagrams, multilevel equations, square root and summation symbols, integral signs and other characters extending above and below the typing line, the vendor said.

A plastic printwheel offers 92 scientific characters plus the ability to construct 11 characters.

A CPT 8100 with scientific symbols costs $12,960. The upgrade of a CPT 8100 to include scientific symbols costs $1,250.

More information is available from CPT at 8100 Mitchell Road, P.O. Box 295, Minneapolis, Minn. 55440.

Cook Urges Use of IRM

(Continued from Page 79)

Next Cook told the audience to develop IRM supporting tools such as building an information locator, data dictionaries and establishing audit and controls.

An IRM can improve the productivity of management and staff, provide more consistant information from distributed sources, reduce the reporting burden on components and involve the user in managing his own information, Cook said.

Cook warned the audience that in trying to establish an IRM they should be aware of problems such as internal power struggles, information control disputes, resource constraints, varying degrees of expertise and resistance to change.

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Apple III Gets WP System

NORWALK, Conn. — A word processing system for the Apple Computer, Inc. Apple III personal computer has been announced by Westico, Inc.

Word III is designed for first-time computer users with documentation said to lead users through the steps for entering, editing and printing documents, the vendor said.

Users can scroll forward and backward through the text, modify or replace any part of the text, insert and delete characters, lines and paragraphs and insert or append text from other files, the company said.

Word III is priced at $195 for software and documentation from Westico, Inc., 25 Van Zant St., Norwalk, Conn. 06855.

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Series 2400 gives you a strong option in high resolution monochrome. With Conrac's proprietary circuitry, this 19-inch tube performs like never before. It accepts either standard resolution EIA RS170 or high resolution EIA RS343 composite video inputs.

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'Spellbinder' Features WP, Office Management Support

SAN LEANDRO, Calif. — A word processing software package said to offer both novice and experienced users office management and word processing capabilities has been announced by Data Technology Industries, Inc.

Spellbinder includes a hierarchy of Macro commands for such tasks as Que and Zip sorting, mail merge, forms generation and line numbering, the vendor claimed.

In the edit mode, the user may select submodes including word, character, sentence and paragraph, allowing backward and forward movement and deletion by any one of the submodes, the company said.

Spellbinder is priced at $350 from Data Technology Industries, 700 Whitney St., San Leandro, Calif. 94577.

Xerox Unveils Mailing Systems

MUNDELEIN, Ill. — Xerox Corp. announced two computer-based mailing systems for address list creation, list file maintenance and generation mailing labels.

The Cheshire DI 785 is a microprocessor-based tabletop device that images addresses directly onto envelopes and uses a liquid toner process to place addresses on envelopes as they appear on master tab cards, the company said. It was designed for users with monthly mail volumes in the 1,000 to 209,000 range.

The 745 Mail Manager consists of a CRT terminal display screen and a CPU with two floppy disks and a printer. It is dedicated to mail list management with software that permits users to make mailing list additions, deletions or changes, the company claimed.

The 745 Mail Manager is priced at $17,000 and the 785 at $4,995 from Xerox Corp., 404 Washington Blvd., Mundelein, Ill. 60060.

Contractors Get Billing System

STERLING, Va. — An accounting and billing system for federal government contractors is being offered by Berman Associates for users of Lexitron, Inc. word processing equipment.

Time/Expense Accounting System (Teas) permits entry of employee time sheets and expenses, as well as vouchers and other transactions. Reports such as time analysis, direct labor billing, direct expense analysis and others are available.

A built-in list management feature allows additional reports to be created by the user. Invoices may be produced on standard government forms or on letterhead.

The Teas package runs on Lexitron word processing equipment, using the VT Basic option. Two diskette drives are required. The price of $3,000 includes installation, training and support and two user manuals, according to the vendor.

Berman Associates is at Suite 14, 101 E. Holly Ave., Sterling, Va. 22170.

Tyrop Converts IBM Selectrics

THOUSAND OAKS, Calif. — An electronic typewriter adapter designed to convert IBM Selectric or other equivalent typewriters into computer output printers has been announced by Hollander Office Products.

The Tyrop features a printing speed of 600 char./min, a variety of computer interfaces including RS-232C and the IEEE option and a built-in self-diagnostic function allowing users to monitor printing functions, the vendor said.

Tyrop is priced at $1,000 from Hollander at Suite B, 41 Duesenberg Drive, Thousand Oaks, Calif. 91362.

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'Tips' WP Software Runs On DG Computers

PALO ALTO, Calif. — Word processing software for Data General Corp.'s computers ranging from the MPT100 to the 32-bit MV8000 Eclipse is available from Information Processing Techniques Corp.

The Text Information Processing System (Tips) is an assembly language program that reportedly emphasizes ease-of-use with English commands executed from either the standard keyboard or special function keys, the vendor said.

Multilingual capability is also offered with French, German and Dutch versions. Tips for the MPT100 costs $1,200.

Information Processing Techniques Corp. is located at 1070 E. Meadow Circle, Palo Alto, Calif. 94303.

System 3000 Tied To High-Speed Printers

BOULDER, Colo. — NBI, Inc. has announced a binary synchronous communications package said to enable the company's System 3000 word processor users to work with high-speed ink jet and laser printers for more rapid document transfers to and from computers and other word processing systems.

The Bisync communications option emulates the IBM 2780/3780 communications protocol, permitting disk-to-disk document transfers with compatible systems and devices, the company claimed.The Bisync communications option is priced at $1,500. NBI, can be reached through P.O. Box 9001, Boulder, Colo.

Wheel Gets 15 Char./In.

LOWELL, Mass. — Wang Laboratories, Inc. has announced 15-pitch printwheels with 15 char./in. for use on its Office Information System printers and Wangwriters.

Offered in three different character sequences, the 15-pitch printwheels are available in one style: Detail 15 supports English, French and German; Canadian Detail 15 supports usage in the U.S., the UK and Canada; and Scandinavian Detail 15 supports usage in the Netherlands and Scandinavia, the vendor said.

Prices for a package of three plastic printwheels begin at $25 from Wang Laboratories, Inc., One Industrial Ave., Lowell, Mass. 01851.

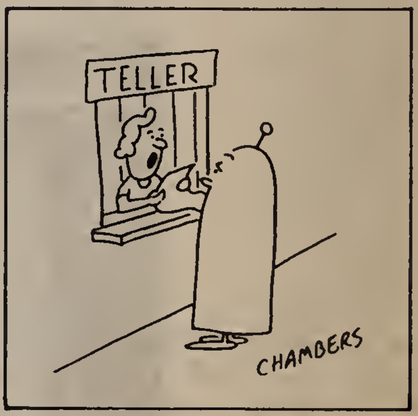
Pace8000 Aids Self-Training

MINNEAPOLIS, Minn. — CPT Corp. has introduced Pace8000, a self-paced, self-administered training program for use with the CPT 8000 word processor.

Pace8000 explains the concept of word processing, provides reference guides and gives instructions for operating the CPT 8000. It allows users to train an unlimited number of new operators at their convenience and select only those applications that apply to their jobs.

The instructions are prerecorded on three floppy disks and are divided into two packages: training and reference.

The training program costs $200 from CPT at 8100 Mitchell Road, P.O. Box 295, Minneapolis Minn. 55440.



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Issco Hitching Graphics Star To Joint Ventures With CPU Vendors

By Robert Batt
CW West Coast Bureau

SAN DIEGO — A series of joint venture operations with leading hardware manufacturers is being undertaken by Integrated Software Systems Corp. (Issco) in a bid to exploit the burgeoning business graphics market.

Following a deal signed six months ago with Prime Computer, Inc. to convert its graphics software to run on Prime systems, Issco has now concluded a similar agreement with Perkin-Elmer Corp. In addition, Issco is holding discussions with Data General Corp., Burroughs Corp. and Digital Equipment Corp. about providing similar software conversions.

In the case of Burroughs, Issco said it is working on providing software to run on the company's anticipated virtual system, yet to be announced.

"We get a lot of requests from customers to run our software on their mainframes. The user is very aware of the explosion in the graphics market that is now taking place and we are carefully selecting those vendor markets we wish to support," Meldon Gafner, Issco director of marketing, said.

Gafner said the decision on which manufacturers' hardware Issco would support depends on criteria such as the market segment in which they operate, the nature of their marketing operations and the size of the installed base.

Key to Success

According to Issco, success in the computer business graphics market depends on being a completely integrated manufacturer with the emphasis on software.

"Our strategy is to become a full software company because that is the key to success. At the moment the lack of the right software is a hindrance to market growth and the problem is to get an application packaged in such a way that it is not only the innovators who can use it," Peter Preuss, company president, said.

Preuss claimed that what was needed was application software bought off-the-shelf so that graphics could half penetrate every area of the Fortune 500 companies.

"We have been forced to listen to our users and come up with answers that have cost us money and effort. At the same time, we recognize that it has helped us to create a market and that is why we are willing to join hands with other manufacturers and expand the market," Gafner said.

"A reputation for quality is essential. When a data processing manager takes our equipment and the criteria by which he is judged is enhanced by using the system, we have succeeded because he will tell the [DP manager] down the road and that is how we expand our business," he added.

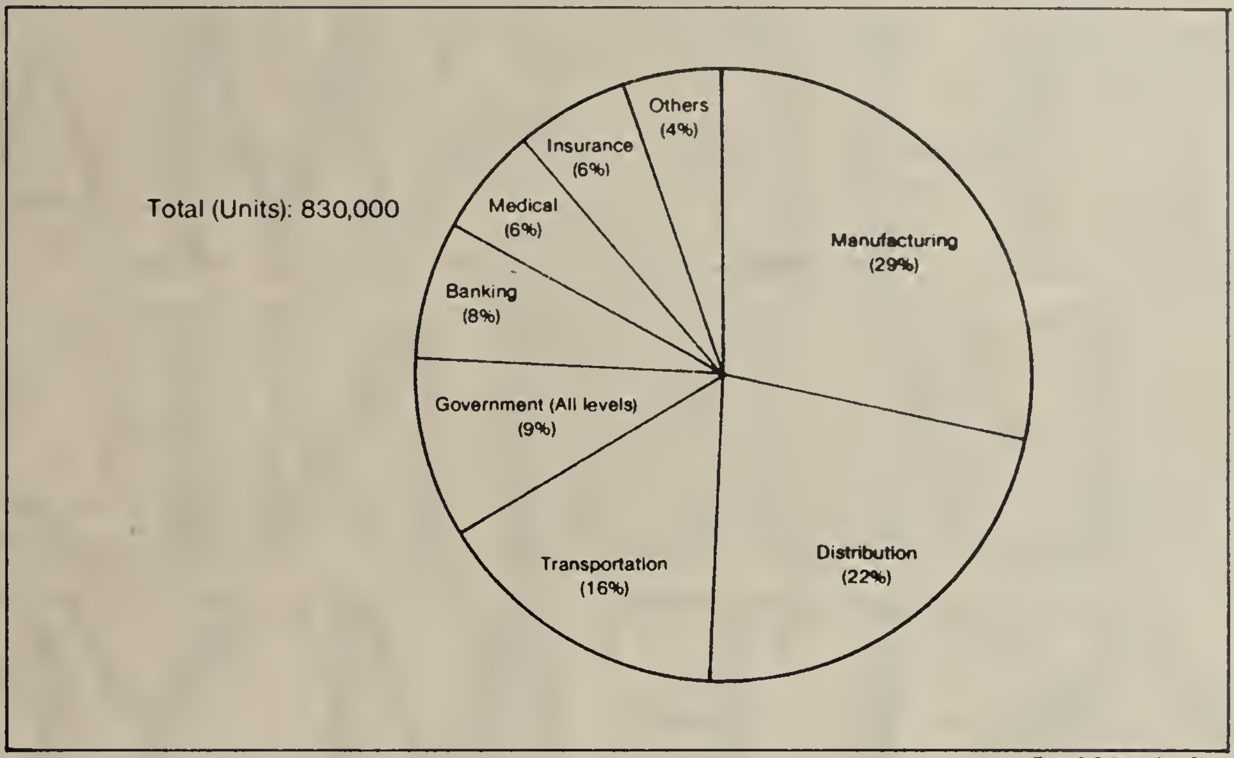
Managers Confused

Issco claimed that although the need for graphics capabilities was now much better understood than hitherto, DP managers were still confused because they did not know where to go to get the capabilities they wanted. "All they know is that they have been told to get graphics by their senior executives," Gafner said.

There was, he added, a strong trend in

(Continued on Page 86)

F&S Predicts 37% Growth Rate In Intelligent Terminal Market; Base to Hit 2.9 Million by '85



Frost & Sullivan, Inc. Chart

Installed Base of Intelligent Programmable Terminals in Industry

NEW YORK — Although intelligent terminals account for only 17% of total terminal installations today, this market segment will grow by 37% annually through 1985 compared with a 20% annual growth rate for the rest of the terminal market, according to a recently published study from Frost & Sullivan, Inc. (F&S).

By 1985 the installed base of intelligent (programmable) terminals will reach 2.9 million units, about triple the 830,000 units installed in 1981, the report maintained. Over this five-year period the cumulative market for these units will total $17 billion, the survey forecast.

This year the value of intelligent terminal shipments will be up 50% from 1980's shipment value. The strongest move to intelligent terminal usage has been from the banking, wholesale, manufacturing, transportation and medical industries.

High Demand

Because these intelligent units can operate as general-purpose processors, the demand for programming languages and operating systems is high. This is fueling market growth for independent programming for these units, which will grow at a 30% annual growth rate, reaching $50 million in revenues by 1985, the report stated.

When incorporated into workstations, intelligent terminals are heavily associated with peripheral devices. Although today the floppy disk is the most widely accepted storage device used with intelligent terminals, Winchester disks will gradually displace the floppy, the study claimed.

However, printers are not yet widely used with intelligent terminals. Out of 86 intelligent terminal workstations examined by F&S, only 29 offered a printer option. The survey indicated users had a growing demand for printing capability to be incorporated into these terminal devices at the workstation levels.

Users also noted current models of intelligent terminals are not yet powerful enough and faulted vendors for sketchy support of these units.

However, such criticism is not a major deterrent to acquiring more intelligent terminal units as savings on central file storage and communications costs offer sufficient return on investment, the F&S user analysis found.

The industry is not currently dominated by the large mainframe vendors, the report noted. However, the F&S study projected that by 1985 both IBM and Burroughs Corp. would each gain a 7% market share in the intelligent terminal market, pushing them into the ranks of the top 10 suppliers.

Today the dominant suppliers in the market include Raytheon Data Systems Co., Four Phase, Inc., the Incoterm subsidiary of Honeywell, Inc. and Datapoint Corp.

Besides examining user and market considerations, the F&S study projected that videodisk technology used in conjunction with intelligent terminals will double the demand for intelligent units once the problems related to the recording and indexing of disks are solved.

The report, entitled "The U.S. Market for Intelligent Terminals," is priced at $1,100 and is available from F&S at 106 Fulton St., New York, N.Y. 10038.

IBM's DPD Takes Stab at OEM Mart With Model 680

WHITE PLAINS, N.Y. — IBM's Data Processing Division (DPD) is taking its first stab at the OEM market with a stripped-down Winchester disk drive, the Model 680 disk storage assembly.

This marks the first time DPD has offered an exclusively OEM product. IBM's General Systems Division has been offering OEM discounts on complete products, such as its Series/1 processors, for some time. The Model 680 is a nonremovable 8-in. unit with a 65M-byte capacity. It will be sold on an OEM-only basis, with the OEM supplying the packaging, power supply, controller and software support, IBM said.

The 680 is the same basic unit that is installed in such IBM products as System/38, System/34 and 8100 processors, as well as the 3310 and 4963 disk drives.

Price and discount depends upon the number of units purchased: one to 99 units, $6,600 each; 100 to 249 units, a 17% discount; 250 to 449 units, a 27% discount; and 500 units or more, a 33% discount.

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A national firm of certified public accountants has reviewed and tested these systems and has prepared a report containing their opinion, a copy of which is available from Data General upon written request.

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ADR Gains Exclusive Rights to 'Data Designer'

By Rita Shoor
CW Staff

NEW YORK — Applied Data Research, Inc. (ADR) joined forces with data base theorist James Martin when the software vendor announced recently that it has acquired exclusive worldwide marketing rights to Data Designer for users of Datacom/DB, ADR's IBM-compatible data base management system (DBMS).

Utilized as an interactive data base design tool, the Data Designer package was developed by Martin, who is founder and chairman of Database Design, Inc. (DDI).

ADR will license the product, which links with its Datadictionary software, as part of its integrated network of systems software packages.

DDI will continue to license Data Designer as a stand-alone product, according to Martin, who joined ADR president John R. Bennett for the announcement here.

Tool for Planners

Data Designer is a tool for planners and data administrators that should allow them to generate a data base in its most stable form, according to Kenneth Parker, ADR's director of marketing.

"The problem with most data base designs is that they must frequently be redone every two to three years," he said. By automating the data base design phase, Data Designer allows these users to model and design a flexible data base so that an organization can meet the requirements of future, as well as current organizational needs, he claimed.

Based on a mathematical concept called "canonical synthesis," which involves reducing complex functions into their most simple form, Data Designer accepts the requirements of multiple users and builds a "simple and stable structure, which supports them all," the vendor claimed. This supposedly ensures that future data base restructuring is minimized.

In a Datacom/DB environment, the process would begin with collecting user views via an "organized methodology" and feeding the views to ADR's Datadictionary product.

The output from the dictionary software would be valid data items that meet corporate data standards. These would, in turn, be the input to Data Designer, which validates and synthesizes the data into a logical model in third normal form, Parker explained.

The resulting design can then be reviewed by data administrators who, through experimenting with adding or deleting user views in various models, would evaluate the impact of potential changes on the original design.

Once the logical model has been accepted, it can then be mapped on to a physical design with Datacom/DB, he said. The result should be a relatively stable data base, according to Martin, who maintained that "if designed correctly, data entities in most large corporations are stable.

"Data attributes don't change [although] procedures change enormously," he said.

Designed to operate under OS, IBM's time-sharing option, and interactively under ADR's Roscoe time-sharing option, Data Designer is priced from $27,000 to $32,000 depending on selected options. ADR is located at Rt. 206 and Orchard Road, CN-8, Princeton, N.J.

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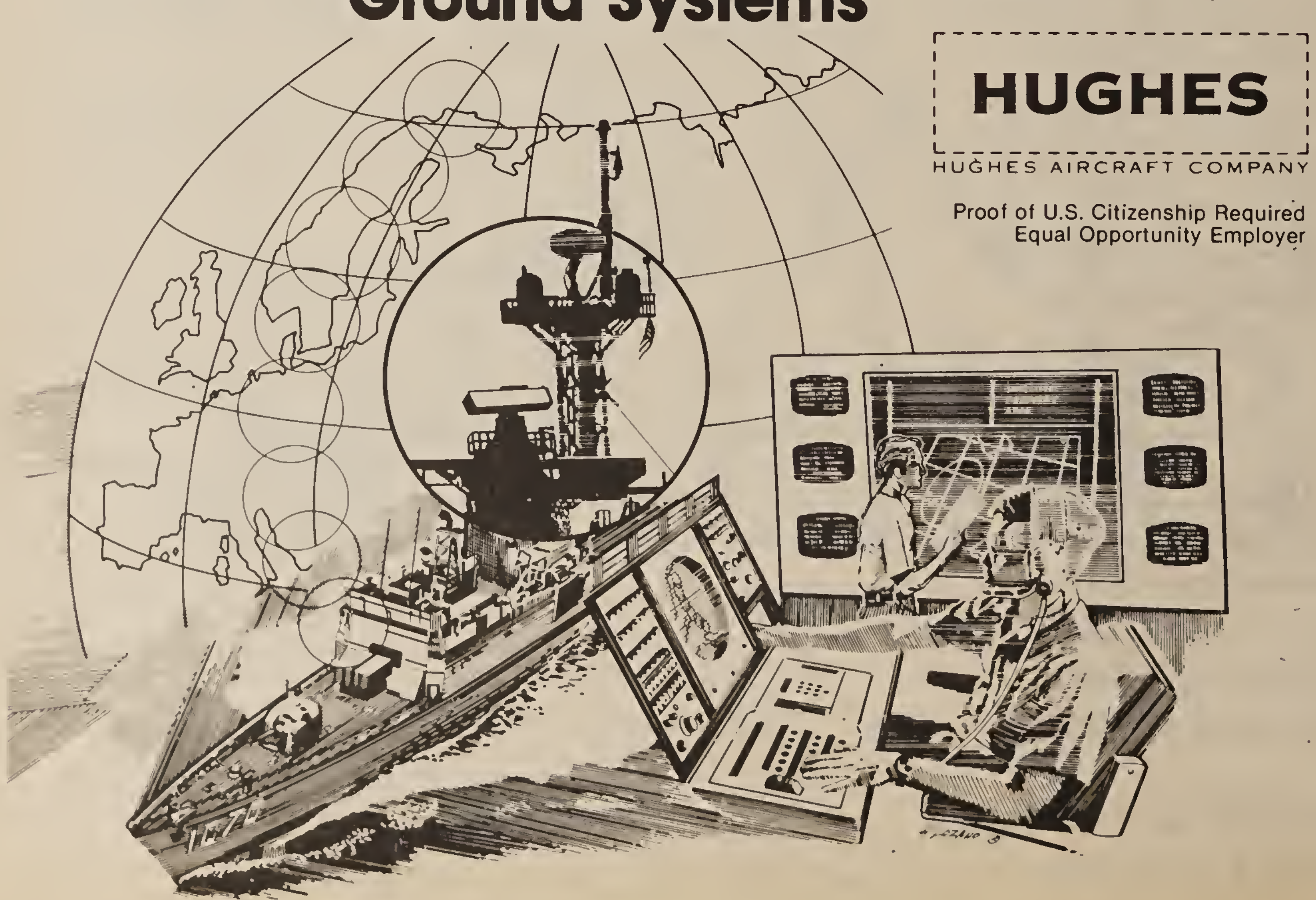

Issco Enters Graphics Mart

(Continued from Page 83)

research and development toward providing computer graphics of a quality at least equal to that of graphics artists. However, the limiting factor was that graphics was only as valuable as the data to be displayed.

"The question is can you do something in a feasible amount of time and at the right cost. The problem is that MIS managers don't even know what kind of data they wish to display. Even the large scientific applications market is not as well progressed as we sometimes think," Gafner said.

"Educating the user is our biggest obstacle. If the [DP managers] knew what is available and feasible and were able to represent this to their senior managers, we would have a substantially faster growing market than even now exists," Preuss explained.

At the same time, Issco claimed, demand is far higher than it can meet and its operations are entirely in response to that demand. There was a large penetration, particularly of business graphics, among the large corporations — pin up demand — as managers learned about the use of computer graphics as a business tool.

Users wanted to be able to grow into their graphics packages and so they constantly looked to the DP department for training.

In response, Issco said it has been concentrating on making its systems easier to use, for example, by hiring graphics artists to pick colors for ease of use.

Issco, with a user base of more than 600 installations, has two main products — Disspla and Tell-a-Graf — that it markets from its headquarters at 4186 Sorrento Valley Blvd., San Diego, Calif. 92121.

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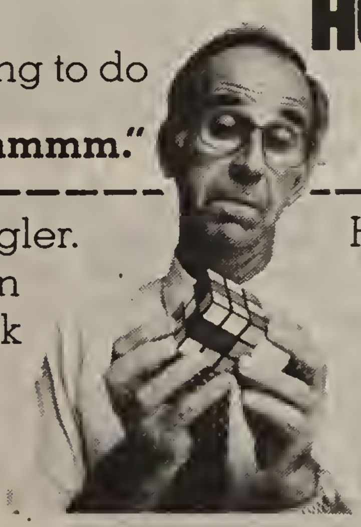

Hummm, Lear Siegler. You've certainly given me something to think about. I asked my distributor about the Hummm Terminal.

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Distributor Sales Rep________________________

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Distributor Telephone________________________

Lear Siegler, Inc., Data Products Division, 714 North Brookhurst Street, Anaheim, CA 92803. Attn: Adv.

A

Intel Starts Custom Foundry for LSI Designers

By **Robert Batt**
CW West Coast Bureau

CHANDLER, Ariz. — Intel Corp. has established a silicon foundry operation here to provide large-scale integration (LSI) manufacturing capability to customers with in-house LSI design expertise.

The new Intel operation will make available its high perforance, n-channel, metal oxide semiconductor (HMOS) and high-performance, complementary MOS (CHMOS) process technologies to customers who have designed and laid out their own LSI circuits.

Intel claimed that many users of semiconductor devices have backed away from setting up their own fabrication systems due to the rapid pace of chip process technology.

"These companies have special needs for proprietary LSI chips. They cannot, however, justify the time and expense of purchasing and maintaining costly, advanced manufacturing equipment and setting up high-yield and cost-effective lines and processing techniques," Jack C. Carsten, vice-president and general manager of Intel's Microcomputer Division, explained at a recent press conference here. "This silicon foundry operation is a major commitment to the new business of marketing state-of-the-art manufacturing capability."

Intel claims the silicon foundry operation will enable customers to develop their own proprietary value-added designs without incurring the expense of establishing and maintaining a full fabrication plant. The company claims the foundry will save customers the cost of developing a new LSI process, which it estimates would cost between $3 million and $8 million.

Intel estimates that this new market is worth $50 million at current prices and the company anticipates that it could grow to around $500 million by 1985.

Included in the HMOS and CHMOS manufacturing processes available to customers will be custom designs produced on the same fabrication lines as standard Intel products, which the company claims reduces risk in using advanced processes. Packaging and testing services are also available.

First customers are expected to be those companies involved in designing LSI peripherals and controllers and those with specialized needs in the data communications and telecommunications industries. Intel said it had received orders, but refused to name the customers.

In addition to the basic silicon wafer processing, Intel said it will give customers access to the same design tools that are used internally to develop advanced designs. The foundry, it claimed, would provide customers with a complete set of design rules on the manufacturing process selected.

In addition, the customer will be given access to key electrical parametric values, tools for circuit modeling and a means of checking layout against design rules and circuit schematics.

Mergers & Acquisitions

Digital Research, Inc. has acquired **Compiler Systems, Inc.**, a $1 million language company located in Sierra Madre, Calif.

Total Technical Services, Inc. recently pruchased the Minnesota-based **Manufacturers Maintenance Corp.**, formerly the Fabritek Memory and Systems Service Division.

Safeguard Scientifics, Inc. has signed a tentative agreement to acquire a majority interest in **Coherent Communications Systems Corp.** for $10 million.

San Diego Bancorp will acquire **Telecommunications International, Inc.** in the form of a 100% stock take over.

Under a recent agreement in principle, **Computer Products, Inc.** will acquire **Stevens-Arnord, Inc.**

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Executive Corner

- Dr. Kiyoshi Kakita has been named chairman of the board of NEC America, Inc. He succeeds Kozo Hirayama who resigned from that post last June.
- Anthony N. LaPine has assumed the position of president and chief executive officer at Digital Recording Corp.
- C.J. Magnussen resigned in June as senior vice-president of ITT Courier.
- Richard N. Hykes has joined Ferox Microsystems, Inc. as vice-president of marketing and a member of the board of directors.
- Tymshare, Inc. has appointed Robert A. Holub vice-president and treasurer.
- David B. Scott has been named vice-president of systems management at Logisticon, Inc.
- Jack Okazaki has joined Capro, Inc. as vice-president of systems development.
- Rudolf J. Konig has been promoted to vice-president, business planning and development, for the information services group of Informatics, Inc.
- Roger W. Vass has been named vice-president of marketing and sales at Altos Computer Systems, Inc.
- Bob Freischlag has been promoted to senior vice-president of Fujitsu Microelectronics, Inc.
- Brendan Coyle has been promoted to vice-president and general manager of the supplies division of Dataproducts Corp.
- John R. Finch has been appointed vice-president and general manager at National Semiconductor Corp.
- Michael H. Anderson has been named to the newly created post of vice-president of marketing at Nixdorf Computer Corp.
- John Cook and Paul Newton have been named vice-presidents of University Computing Co.
- Del Yocum has been elected corporate vice-president at Apple Computer, Inc.
- Thomas A. Benedett has been named vice-president of human resources at United Telecommunications, Inc.
- Joseph C. Uhland has been appointed vice-president of engineering at Scan-Data Corp.

OEM Business Forum Scheduled for Oct. 5-6

NEW YORK — When the OEM Business Forum convenes here Oct. 5-6, the program will boast at least 17 company presidents, 12 vice-presidents and general managers and a dozen product marketing managers on the agenda.

Executive sessions at the conference, sponsored by *Computer Business News*, will address issues pertinent to senior managers in the burgeoning OEM, minicomputer and turnkey systems field. Other topics will cover the many software and service suppliers packaging minis, micros and application solutions, according to a spokesman.

Keynote Speaker

Keynote speaker will be Allen Lay, president of Cado Computer Systems, Inc. Also on hand will be Dr. Lawrence Chimerine, president of Chase Econometrics Associates, Inc., who will describe the impact of "Reaganomics" on the industry, the spokesman noted.

Mergers, acquisition and diversification will be covered by Philip J. Conrads, principal, McKinsey & Co., and by Gilbert Mintz, partner, Broadview Associates, Inc.

Conference attendees are coming from Canada, Chile, Singapore, Mexico, Brazil and Sweden, as well as the U.S., the spokesman said.

Registration is $345. Further details are available from Louise Myerow, CW Conference Management Group, P.O. Box 880, Framingham, Mass. 01701.

Tandy: Won't Affect Scheduling

Designer of TRS-80 Quits Tandy

By Bill Laberis
CW Staff

FORT WORTH, Texas — The man who almost singlehandedly designed the hardware and software for the Radio Shack Corp. TRS-80 Model 1 microcomputer has resigned as the company's director of advanced development.

Steven Leininger left Radio Shack on Sept. 4 "to seek fame and fortune" on his own, he said, adding that "a lot of the entrepreneurial spirit that [company founder] Charles Tandy had is no longer with the company."

Leininger's leaving will have no affect on production scheduling, despite his pivotal position in product development, a Tandy spokesman said.

"A couple years ago, it would have been a pretty serious blow," said Ed Juge, spokesman for Radio Shack. "But he was one part of a team effort and the team will carry on without him now."

Leininger, who worked at Radio Shack in product development for five years, said he needs the "meanness and leanness of a smaller, upstart company to express and sell" his ideas. He holds no hard feelings toward his former employer, but feels the company, "like other big engineering and manufacturing firms," does not give its design engineers a fair shake.

"Engineers are never put on the same compensation formula that, say, a salesman on the field would get," he said.

"Product development at Radio Shack now has become a real team effort and it's hard to single out who the workers are." The 12 technical employees involved in helping him build the TRS-80 Model 1 have swelled to more than 200 technicians working on current product development.

Leininger said he will spend the coming months assembling team members for an unspecified venture and will also be involved in systems consulting for his old employer among others.

Supershorts

Phoenix Associates, Inc. has been granted an export license by the Department of Commerce to provide software-related technical services to 25 government units of the People's Republic of China under a large-scale DP project.

- - -

RCA Global Communications, Inc. and Kokusai Denshin Denwa Co. this month commemorated 25 years of telex service between the U.S. and Japan. They celebrated by exchanging messages between the officers of the two companies, as they had done in September 1956.

- - -

Information Science, Inc. has established a new divisionalized structure and appointed Leo Kornfeld as company president. The three new divisions are software, services and technical support.

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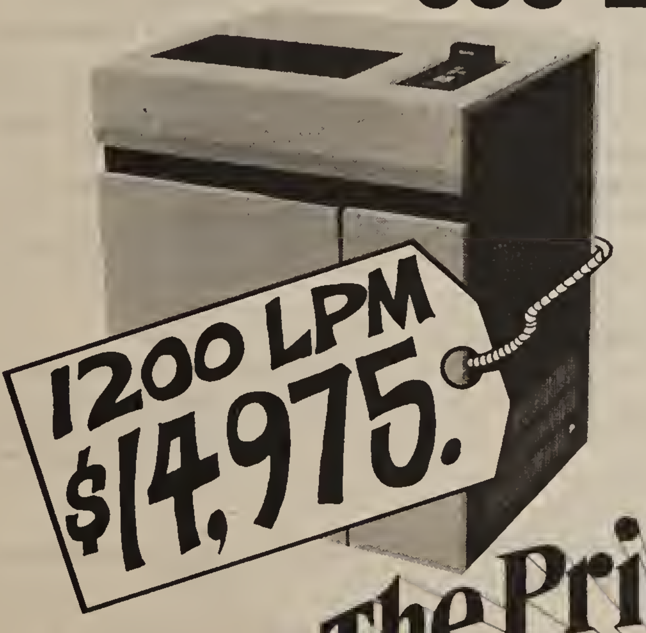

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- How to plan for growth

You can also participate in a wide spectrum of Workshops at THE OEM BUSINESS FORUM and learn more about network configuration, sourcing software packages, design trade-offs in small systems, legal problems and solutions, applications dynamics, new markets, Europe and Japan, and much, much more!

In addition, you'll hear the very latest that's happening at *DEC, DG, TI, IBM and HP* at a series of Watch Workshops spotlighting key executives from these major manufacturers. (And you'll have plenty of time for questions!)

What's more, at THE OEM BUSINESS FORUM, you can listen to some of the leaders in the OEM marketplace, speaking on a variety of topics vital to your future in this business. (For a look at some of the speakers in store for you, see the listing in this advertisement.)

No ordinary conference

Because this is no ordinary forum, we picked an extraordinary place to hold it, The New York Hilton in New York City. With all the facilities you need to work through the day and relax at night.

October 5 (Day 1)

8:45-9:15 **Keynote**
A-1 Al Lay
President
Cado Systems Corporation

9:15-9:45 **Coffee Break**

9:45-10:45 **Mini & Micro Based OEM Business Update**
A-2 Lawrence Chimerine
President
Chase Econometrics,
A Div.
of Chase Manhattan Bank

Richard Raysman
Attorney/CBN Columnist
Brown & Raysman

8:45-10:45 **The Magic of Sales**
A-3 Robert Hardy
President
Computer Composition
International

11:00-12:00 **OEM Survival Tools for the 1980's**
A-4 Jack Keen
Director, Management
Products
Input

11:00-12:00 **Acquisition and Diversification**
A-5 Gilbert Mintz
Partner
Broadview Associates

Robert J. Conrads
Principal
McKinsey & Company

12:00-1:30 **Luncheon**
Art Holst
Author/NFL Official
"The Challenge of a Pro"

1:30-2:30 **Influence of Growing Local Networks (Part I)**
N-1 Chairperson:
Robert Wickham
Vice President, Marketing
Vector Graphic, Inc.

Robert D. Brannon
Marketing Manager
OEM Microcomputer
Systems
Intel Corporation

2:45-3:45 **Influence of Growing Local Networks (Part II)**
N-2 Dr. Harry Saal
President
Nestar Systems

Ivan Socher
President & CEO
Amdax Corporation

4:00-5:00 **Networking and Distributed Data Processing**
N-3 Jon R. David
President
Systems R & D Inc.

Brian Green
Regional Director
Tandem Computers

1:30-2:30 **Input/Output: Market & Technological Structures**
T-1 Joseph G. Morris
Senior Vice President
Ramtek

Meldon K. Gafner
Director of Marketing
Communications
ISSCO

Peter Eisenhauer
Vice President, Marketing
Integral Data Systems

2:45-3:45 **Mass Magnetic Memory: Market & Technological Structures**
T-2 Chairperson:
Andrew Roman
Consultant
Random Access
International

Larry Hemmerich
Vice President
Cipher Data Products

4:00-5:00 **Voice I/O and Other Analogue I/O: Market & Technological Structures**
T-3

Len Magnuson
Vice President, Marketing
Centigram

Edward O'Neil
Marketing Manager
Voice Products
Interstate Electronics

1:30-2:30 **Retail Outlets**
O-1 David Pava
President
Byte Industries

Philip L. Reed III
General Manager
On Line Microcenters

2:45-3:45 **Are You Ready for An Ad Agency?**
O-2 Chairperson:
Thomas Casalegno
Publisher
Computer Business News

Robert McCullough
President
Aitkin-Kynett/SCB

Steven Tatum
Director of National
Marketing
Televideo

4:00-5:00 **OEM Agreements**
O-3 Sonny Monosson
Chairman of the Board
American Computer
Group, Inc.

1:30-2:30 **Application Generating Tools**
S-1 Chairperson:
William R. Stow
President
CPU International

Kent Lawson
President
Magna Systems

Chuck Butkus
President
The Software Factory

2:45-3:45 **Software Managment Strategies**
S-2 James Pettinger
Consultant/CBN
Columnist

Stephanie Rosenbaum
President
Tec-Ed

4:00-5:00 **Application Dynamics: Planning for Changes**
S-3 Gary Long
Partner
Lupper & Long

1:30-2:30 **Microcomputer Trends**
P-1 James J. Farrell III
Manager, Technical
Communications
Motorola, Inc.

Casey Powell
General Manager
Special Systems
Operations
Intel Corporation

2:45-3:45 **Legal Aspects of the Third Party Market**
P-2 Peter Vogel, Esquire

4:00-5:00 **Desktop Computers**
P-3 Allen Michels
President
Convergent Technologies

1:30-2:30 **IBM Watch**
C-1 George Pazloff
Director of Value Added
Remarketing
General Systems Division
IBM

H. W. Mattison
Program Manager
Value Added Remarketing
General Systems Division
IBM

Paul H. Espersen
Series 1 Technology
Consultant
IBM

2:45-3:45 **HP Watch**
C-2 Bob Kresek
Marketing Manager,
Worldwide
Third Party Sales
Hewlett Packard

4:00-5:00 **TI Watch**
C-3 Dr. W. Kenneth Wickham
OEM Marketing Manager
Texas Instruments

October 6 (Day 2)

8:30-9:45 **Japanese Vendors "Meet the Press"**
B-1 Thomas Hodson
National Sales Manager
Canon USA, Inc.

John Rehfeld
Vice President
Information Systems Div.
Toshiba

J. Garrett Fitzgibbons

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TRW-Fujitsu Company

Saburo Kikuchi
General Manager
Sony Corp. of America

9:45-10:15 **Coffee Break**

0:15-11:15 **Software: The Growth Area of the Decade**
B-2 Ann Winblad,
Marketing Director
Product Planning
Open Systems, Inc.

James Pettinger
Consultant/CBN
Columnist

0:15-11:15 **Financing Your Business and Product Development**
B-3 Gordon Rapkin
Chief Executive Officer
AMSI

1:30-12:30 **Sales & Marketing Planning**
B-4 Howard Levin
Director, Systems Marketing
Arrow Electronics, Inc.

1:30-12:30 **Stop Giving Away Services**
B-5 George McArthur
Sales Manager
Decision Data

12:30-2:00 **Luncheon**

William Moore, Jr.
Vice President, Computer Operations
Perkin-Elmer Corporation

"Technology Futures"

2:00-3:00 **Europe as a Market**
M-4 Christopher Codrington
Interco Business Consultants, Ltd.

3:45-4:15 **Beyond the European Market: The Next Step?**
M-5

2:00-3:00 **PR: The Unified Corporate Philosophy**
U-4 Chairperson: Vic Farmer
Editor
Computer Business News

Carole Ely
Sr. V.P., Communications
Vector Graphic, Inc.

Mark Nigberg
President
The Nigberg Corporation

3:15-4:15 **Office Automation: One Stepping Stone Beyond WP?**
U-5 Phil Roybal
Manager, Computer Programs
Apple Computer

Thomas R. Sinopoli
President
Thomas R. Sinopoli Assoc.

2:00-3:00 **Special ADAPSO Session**
P-4

2:00-3:00 **Sourcing Software**
S-4 William Grinker
President
American Computer Group, Inc.

3:15-4:15 **Watering the Software Desert**
S-5 Ben J. Dyer
President
Peachtree Software Inc.

Barbara L. Stafford
Director, Sales & Marketing
TCS Software

2:00-3:00 **DG Watch**
C-4 Patrick Dodds
Marketing Manager
General Distribution
Data General Corporation

Al Ormiston
Product Mktg. Mgr.
Data General

Richard R. Farwell
Director Mktg. Support
Small Business Sys. Div.
Data General

3:15-4:15 **DEC Watch**
C-5

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The fee per person: $295 ($345 after September 1st), and you can charge t to your American Express, VISA or MasterCard account.

Registration Information

Cost is $295 for two full days of sessions and lunch each day. There will be a $50 service charge for cancellations after September 28. Registration may be transferred at no charge. Contact the New York Hilton directly for hotel accommodations; call 212-586-7000, and mention you'll be attending The OEM BUSINESS FORUM.

Registration Form

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20 Software/Service Vendors
30 Multi-Quantity End Users
40 Manufacturers of Computer Systems or Peripherals
50 Manufacturers of Office, Business, Personal and Consumer Systems
60 Hardware OEMs
70 Distributors/Dealers/Retailers
80 Consultants
90 Other (Specify)__________

B. Title/Function. Please circle ONE only.
10 Corporate Management
20 Operations Management
30 Software Development
40 Engineering
50 Marketing
60 Consultants
70 Researchers/Educators
90 Other (Specify)__________

C. Size of Organization (no. of employees)
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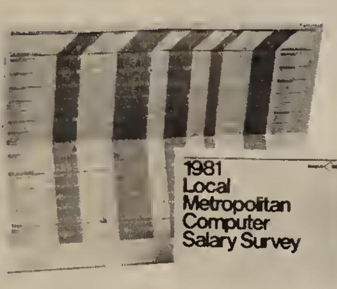

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Major division Fortune 500 co wants solid exp in Acctg appl. Prefers IBM will look at others. Data base exp, exp IMS big plus. To **$30,000**

DIRECTOR

Largest co of its type in FL. Min 7 yrs exp, at least 3 of which as a manager. Large IBM hdwe. Planning, budgets sys design, hdwe selection, recruiting and training of personnel-retail or wholesale a must. Interpersonal skills very important. To **$35,000**

Stan Allen
ROBERT HALF
of Tampa, Inc.
1311 North Westshore Blvd.
Tampa, FL 33607
(813) 876-4191

MILWAUKEE

MIS DIRECTOR

Are you an executive-calibre individual who is looking for that unparalleled opportunity? This dynamic and prestigious company wants to talk with you now. Experience with DEC PDP 11/70 hardware and ability to develop and coordinate manufacturing and financial systems are important assets. **$30-35,000**

DATA PROCESSING MANAGER

Has your career come to a standstill? Now is the time to get it moving again in this well-organized and progressive company. Large IBM experience and Data Base design are preferred. MAPICS background a plus. **$26-33,000**

Larry Lapetina
Richard Bird
ROBERT HALF
of Wisconsin, Inc.
777 E. Wisconsin Avenue
Milwaukee, WI 53202
(414) 271-HALF (271-4253)

ST. LOUIS

SR SOFTWARE PROGRAMMER

Excellent opportunity for strong Burroughs systems specialist to actively participate in major conversion to Large IBM system. Solid ALGOL skills plus exp with MCP, Data Communications (NDL, DCAL, GOL, GEMCOS) or Data Base Mgmt (DMS-II) required. Valuable IBM training provided. To **$30,000**

EDP AUDITOR

Leading manufacturing firm seeks DP professional for an exceptional upper level position with direct path into management. Two years of EDP auditing or systems programming or DBA skills make the ideal candidate. Accounting or Comp Science degree required. To **$35,000**

EDP CONSULTANT

Four yrs minimum exp and a BS degree required for this key position with St. Louis office of top firm in its field. You will provide marketing support and consulting services to clients. Telephone utility experience or strong DP background a plus. An immediate career. To **Mid $20's** plus bonus

SR BANK MGR CONSULTANT

Well-known prestigious CPA firm needs person knowledgeable of bank operations and EDP hardware, software and systems. Prior prog/anal or EDP Auditor make excellent candidate. Career climbing opportunity. Some travel. To **$35,000**

Delores Cook
Randy Pace
ROBERT HALF
of St. Louis
7733 Forsyth
St. Louis, MO 63105
(314) 727-1535

MIAMI

MAS MGR

Under-challenged? Start-up situation available with National CPA firm as manager of EDP Consulting Division. You will hire and train your own staff. Qualifications include minimum four years experience in Accounting Applications Design, mini systems background and marketing abilities. The ideal candidate should have prior EDP consulting experience with a large CPA firm or exposure to real estate and hotel industries. You will build the S Florida market for the firm. Call us for further information. Salary to **$50,000**

Bonnie Gouz
Chuck Nell
ROBERT HALF
of Miami, Inc.
1395 N.W. 167th Street
Suite 100
Miami, FL 33169
Dade (305) 625-5433
Broward (305) 764-1550

CHICAGO

PROJECT LEADER

Want to enhance existing financial systems and develop new ones? IBM OS/VS, VS 1 experience with any access method; CICS a big plus. Heavy interface with users, supv small staff. Blue Chip Company. **$28,000**

PROJECT LEADER

Hard to top this company. Their IMS - DBDC project will involve heavy design, analysis and implementation of a new system. Manufacturing and financial applications. IBM 3033 OS/MVS shop. **$39,000**

George Thomas
Bob Hendrix
Sandy White
ROBERT HALF
of Chicago, Inc.
35 E. Wacker
Chicago, IL 60601
(312) 782-6930

PORTLAND

ON-LINE SYSTEM ANALYST

Major client seeks 7-10 yrs exp as P/A or S/A. Must have **STRONG** on-line design, COBOL, DL/1, command level CICS. Heavy weight position. Salary **$30-35,000**

PROG/ANALYST

Expanding Portland client seeks 2-5 yrs exp with IBM & COBOL. Must have some design exp. Prefer background in manufacturing systems. Excellent growth opportunity. Salary **$21-27,000**

Bob Clawson
ROBERT HALF
of Portland, Inc.
1 SW Columbia
Portland, OR 97258
(503) 222-9778

DALLAS

PROGRAMMER ANALYST

Leading manufacturing concern looking for an individual with 3+ yrs COBOL programming. Mfg and Database experience mandatory. To **$27,000**

SYSTEMS ANALYST/ CONSULTANT

Will take a leading role in the development of a sophisticated software pkg. Must have a solid CICS and analytical bkgd. Will also act as in-home CICS consultant. IBM DOS or OS, COBOL and CICS experience mandatory. To **$35,000**

PROGRAMMER ANALYST

Shop expansion has created the need for additional programmer. Looking for min two yrs IBM OS or DOS, COBOL programming ability. To **$27,000**

John Staiger
ROBERT HALF
of Dallas, Inc.
Two NorthPark East, #750
Dallas, TX 75231
(214) 363-3300

KANSAS CITY

SR MIS PLANNER

Newly created corporate planning function seeks an experienced MIS Planner. Become immediately involved in long range planning, feasibility studies and project planning. Prior experience in large scale systems and hardware evaluation required. Good verbal and written communications skills a must. Excellent visibility to major corporate exec's with promotion possibilities throughout the whole corporation. Salary **$35,000**

LEAD ANALYST

Nationally known KC firm seeks a degreed analyst to take complete charge of the evaluation and installation of a new corporate general ledger package. Prior experience with accounting systems required. Ability to work with end-users and evaluate current general ledger packages required. Salary **Low $30's**

MANAGEMENT SERVICES

National consulting firm seeks a degreed individual with multiple programming languages and design experience. Person must possess good communication skills and the ability to analyze client needs and recommend appropriate solutions. Must be capable of working in diverse mainframe environments. Salary **$32,000**

PROGRAMMER/ANALYST

Join this newly formed project team in this expanding state of the art MVS shop. Be involved on the ground floor design of new systems. Two years COBOL programming qualifies. Be trained in the latest WARNIER-ORR techniques. Excellent advancement. Salary to **$28,000**

PROGRAMMER/ANALYST

Exploding 34 shop with system 38 on order needs take charge RPG II programmer. Must be capable of working with users in developing new applications from start to finish. Excellent benefits, bonus and profit sharing program. Salary to **$28,000**

George Waterman
ROBERT HALF
of Kansas City, Inc.
127 W. 10th
Kansas City, MO 64105
(816) 474-4583

LOUISVILLE

4300 SYSTEMS PROGRAMMERS

The most demanding product of the 80's is making the demand for DOS/VSE and OS systems programmers on 4300's at a skyrocketing level. 1+ yrs. experience is all that is required. Salary range **$23-36,000**

DATA BASE ANALYST

IMS is the key to opening a new career. Several openings exist for DBA positions with IMS, DL-1 background. Degree is only a plus not required. Salary range **$25-40,000**

MGR TECH SUPPORT

Current manager of a tech support area with OS/MVS is what a Large corp MIS shop is seeking. Will control all systems programming except CICS. All relocations paid including home loan. Degree required. Salary to **$40,000**

Tom Williams
ROBERT HALF
of Louisville, Inc.
680 South Fourth St.
Louisville, KY 40202
(502) 585-1751

TULSA

DP SUPV

If you think you're good, our client wants you to prove it. Fortune 500 subsidiary needs take charge systems analyst to supervise 3-5. Strong tech skills a must. DOS, CICS, COBOL, & RPG II, IBM 4341. Capable of designing new systems. Project leader exp or mfg background a real plus. **$35,000**

ROBERT HALF
of Oklahoma, Inc.
5840 S. Memorial Drive
Suite 217
Tulsa, OK 74145
(918) 627-1600

SOUTHERN CALIFORNIA

LOS ANGELES

SENIOR SYSTEMS ANALYST

Fortune 500 Division seeks a creative success oriented Sr Systems Analyst for their IBM 3033 Installation. Requires 3+ yrs of OS-COBOL in financial or insurance applications. IMS or CICS pref. Exceptional benefits include extensive in-house career development and flex hours. Fee paid. To **$34,900**

Joe Reese
Ajay Berry
ROBERT HALF
of Los Angeles
3600 Wilshire,
Suite 2000
Los Angeles, CA 90010
(213) 386-6805

ORANGE COUNTY NEWPORT BEACH

MVS SYSTEMS PROGRAMMER

Major insurance co has super opportunity. If you're an action oriented professional with a strong technical background, then you can help them convert to a system 3081H. Fee paid. Salary to **$35,000**

Al Handler
ROBERT HALF
of Orange County
2333 N. Broadway, #200
Santa Ana, CA 92706
(714) 835-4103

COMMERCE

EDP AUDITOR

Billion Dollar LA Corp seeks Auditor with skills in application systems development, data center auditing and audit staff support. Super Benefits, including travel. Fee paid. To **$35,000**

Bob Dack
ROBERT HALF
of Los Angeles
6252 E. Telegraph Road
City of Commerce, CA 90040
(213) 721-2197

MEMPHIS

Have you saved or earned your company money and nobody remembered?

Call us collect! Let our professionals consult with you and get you back on track with a career oriented organization.

Judy Gurley
ROBERT HALF
of Memphis
825 Ridge Lake Blvd.
Suite 350
Memphis, TN 38119
(901) 683-5821

NEW YORK

BAL 4341 APPLICATIONS

Potential for significant career growth with this multibillion dollar conglomerate. 4+ years DOS BAL programming. COBOL programming and/or teleprocessing experience is a definite plus. Responsibilities include development of ON-LINE trading system using IDMS. No ceiling on dollar potential. **$35,000**

COBOL DEVELOPMENT

Very promotable and rewarding opportunity in beginning stage of 6 year development project. 4+ years in EDP, OS COBOL programming and 1+ years structured design experience. 100% development in multi 3033, OS, IMS environment. Outstanding fringes including 3 weeks vacation. **$28,000**

RPG II SYSTEM 34

Opportunity to learn SYSTEM 38 and Mainframes in this multi computer environment. 2+ years RPG II and system 34 experience. Will be responsible for implementation of commercial applications In SYSTEM 34 and 38 environment. The demands are strong but the rewards are great. **$28,000**

FORTRAN REAL TIME

Opportunity to play a lead role in development of commercial applications in an ON-LINE, REAL TIME environment. 2+ years FORTRAN programming with user interface and MINI experience. Develop and install systems at various branches throughout country. 25% travel. **$35,000**

COBOL HP3000

Plenty of room for advancement in this rapidly growing state-of-the-art environment. 2+ years COBOL programming, HP 3000 experience and ability to deal with all levels of management. Analysis, design and implementation of commercial applications. A chance to make it happen now. **$30,000**

SENIOR ANALYST

You will become vitally involved in the MIS area of this major entertainment conglomerate. 4+ years In EDP with 2+ years systems design and DOS COBOL programming experience. Responsibilities include supervision of programmers and heavy user interface. Attractive benefits. **$29,000**

Marty Amato
ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

JACKSONVILLE

SYSTEMS MANAGER

Expanding Corporation seeking a diversified individual to take charge of their mini computer department. Qualifications should include an analytical background in the property and casualty insurance area. In addition, candidate must have prior supervisory experience. Relocation package included. Fee paid by management. Salary to **$28,000**

Doug Cook
ROBERT HALF
of Jacksonville, Inc.
9550 Regency Square Blvd.
Suite 213
Jacksonville, FL 32211
(904) 721-0970

ROBERT HALF

BOSTON

EDP AUDIT SUPERVISOR

Internat-distrib seeks exp'd EDP auditor for supvry role. Will work with internat subs on data center security, stds & new sys control review. Pos can be Boston or NYC based. Salary $38,000

MIS CONSULTANT

Prominent MIS consulting firm (200+ professionals) seeks sr P/A to work with Fortune 100 clients on mfg & fin'l sys design & prog. Pref IBM DBMS COBOL bkgrd. Oppty for partnership. Salary $32,000

PL-1 ANALYST PROGRAMMER

Well respected fin'l svcs firm seeks proj ldr to participate in design & programming of lge funds transfer sys. This hi-visibility proj team works in IBM OS PL-1/CICS environ. Flexible hours & tuition reimb. Salary $29,000

OS SYSTEMS PROG-NH

Corp HQ's of major service org is upgrading to MVS & req's an OS internals hvy. Will work on hardware/software eval team. Knowl of CICS & VM pref. Oppty to join state-of-the-art shop in rural setting. Salary $31,000

TECH SUPPORT SUPVR

Fortune 500 firm (Central Mass) seeks proven OS/MVS specialist to manage 4-person staff. Multi-CPU environ incl DBMS & networking. Oppty for mgmt oriented sys prog to move up in career. Salary $35,000

MFG/MIS MANAGER

Leading mini vendor is totally integrating their mfg sys to incl all remote plants. Seeks dynamic mgr to assume respon for entire effort. Must have hvy mfg & admin exp. Salary $40,000

SOFTWARE TECH WRITER

Nat'ly recog software firm seeks exp writer to prepare customer-oriented product documentation. This fast-growing co offers chance for rapid advancement. Prefer indiv with knowl of hi-level lang & excellent user interface skills. Salary $23,000

Gerry Battista
ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200

SEATTLE

Large Seattle firm expanding staff seeks several prog/analysts with 1 to 5 years COBOL experience in IBM 370/303X OS shops. IMS, CICS background a plus. To $24,000

Anchorage, Alaska bank seeks experienced IBM OS Assembler and COBOL applications prog/analyst. To $32,000

Ray Magill
ROBERT HALF
of Seattle, Inc.
600 University St. #2328
Seattle, WA 98101
(206) 624-9000

DAYTON

PROG ANAL

Tired of maintaining old sys; looking for more challenge? Design, test & implement a new mfg sys. COBOL & mfg a must. Fee paid. $22-25,000

ROBERT HALF
of Dayton, Inc.
First National Plaza
Dayton, OH 45402
(513) 224-0600

PROVIDENCE

SYSTEMS MANAGER

Leading fin'l inst seeks dynamic sys ldr to manage prog staff in lge sys environ. Proven ability to dev major projs ontime within budget, according to specs. Salary range $32,000

TECHNICAL SUPPORT

Major consumer prod mfr seeks sr DOS sys prog. Strong CICS skills desired. Hardware expansion & upgrade involvement. Systems mgmt respons. Salary range $30,000

INSURANCE ANALYST

Prominent NH ins co with state-of-the-art environ desires property & casualty analyst. Tech & communicative skills nec. Proj leadership oppty. Salary range $28,000

DATA BASE ANALYST

Blue Chip RI co seeks sr sys analyst with extensive data base exp. Devel EDP testing for IMS. Maintain data dictionary & provide tech advice. IMS/VS DB/DC environ. Salary to $27,000

HI-TECH ANALYST

Hi-tech mfr desires sys analyst with OS COBOL skills. Lge proj devel oppty. Salary to $25,000

PROGRAMMER/ANALYST

Lge Cape Cod vicinity mfr seeks sr COBOL prog with mfg appl knowl. BAL a plus. Online data base devel. Salary range $21,000

Bob Lathrop
ROBERT HALF
of Providence, Inc.
400 Turks Head Building
Providence, RI 02903
(401) 274-8700

SAN ANTONIO

PROGRAMMER ANALYST

Degree preferred not required. 2 plus yrs COBOL exposure with I/L, C/L appl (banking) experience a MUST. Item processing will instantly fill this position. Burroughs shop but any hardware background acceptable. Will lead to Sr level position. $20-25,000

JR/SR TECH WRITER

Degree in related field. Good oral and written skills a MUST with software related ability a PLUS. Will do rewrite as well as new systems work for either position. Both levels all for a visible/fast track company. $20-30,000

PROGRAMMER

Degree nice but not required. 2 plus yrs COBOL, RPG II exposure with any hardware accepted. Position is intermediate level and will lead to analyst position within 18 months. Good potential and visibility. $18-23,000

ASST DP DIRECTOR

Degree required, 10 plus yrs in DP with last 4 yrs in Financial, Banking environment. Shop is 50 plus people and requirements are budget, motivation, control, cost marketing and total ability in the absence of Director. Job has upward growth in 2 yrs or less. No non-managers need apply.

All position above and many more are in Texas, where "Long Necks", "Armadillos" and the "Cotton Eyed Joe" call home.

Bob Baldaul
ROBERT HALF
of San Antonio, Inc.
First International Bank Tower
Suite #850
San Antonio, TX 78201
1-800-531-5402
In Texas Dial (512) 736-2467

HARTFORD

SR DATACOMM

Premier firm seeks savvy datacomm hardware analyst to analyze, eval, configure & impl datacomm terminals & network facilities. Independent position with hvy vendor contact. Salary to $29,000

CAPACITY PLANNING

Challenging oppty to develop '80's hardware/software plan for outstanding Conn based corp. Min 5 yrs DP. Must have hardware planning & software exposure. IBM 370/3800/3850, CICS, IMS, MVS. Suburban loc. Salary to $31,000

CICS/IMS

Lge nat mgmt svcs client offers unique oppty's to trvl nationwide providing sr lvl tech planning to major US corp's. Salaries to $35,000

SYSTEMS DESIGNER

Conn shoreline oppty for indiv to assume sr corp software/hardware planning for lge multi-div corp. Any hardware bkgrd considered. Salary to $35,000

ASST DP MANAGER

W Mass recreational oppty for IBM S/3 trained indiv to direct instal of mfg sys. IPICS bkgrd pref. Salary to $29,000

MGR BUS PLANNING

Conn consumer goods client seeking indiv with fin'l planning, new product proposals, costs, variances, etc. Sys design, prog & time sharing exp desired. Salary to $36,000

DB ADMIN

Conn Fortune 500 firm seeks min 4 yrs exp. Data dictionary, Cincom, TOTAL & lge scale IBM sys mandatory. Degree. Highly visible role in suburban industrial. Salary to $34,000

Stan Durbas
Paul Meissner
Carol Wilson
ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

WASHINGTON

PROJECT LEADER

Billion $ mfg moving data ctr to N Va. Needs take-charge proj ldr, several analysts & 4 progs w/IBM OS, JCL & CICS to round out start-up staff of 12 pros.

ROBERT HALF
of Washington, Inc.
7316 Wisconsin Ave.
Washington, DC 20014
(301) 652-1960

RICHMOND

SYSTEMS PROG

Va Beach div of huge firm seeks hvy 370 DOS sys prog. Must run environ 25 miles from beach. Low cost of living & great benefits. Low 30's

ROBERT HALF
of Richmond, Inc.
830 E. Main Street
Richmond, VA 23219
(804) 648-3677

BALTIMORE

PROG/ANALYST

Excellent Columbia, MD co seeks solid COBOL prog with CICS exp. Will develop into analyst. $23,000

ROBERT HALF
of Baltimore, Inc.
217 The Quadrangle
Baltimore, MD 21210
(301) 323-7770

BUFFALO

SR PROGRAMMER ANALYST

Profitable div of med instrument mfr needs prog with min 1 yr exp. COBOL, CICS, DOS/VS are the keys to this hi-visibility pos. Hvy user interface with top mgmt. Mfg environ bkgrd nice, but not nec. Salary $25,000

PROGRAMMER ANALYST

Non-profit org needs savvy prog analyst to implement specialized industry sys. Sophisticated IBM shop converting to state-of-the-art hardware; DL1, CICS, DOS/VSE all actively in use. Resp for leading team of progs. Salary $25,000

SYSTEMS ANALYST

Southern tier of NY state mfg co needs analyst with IBM sys 34 bkgrd. Pos rpts to acctg mgr. Strong design & implemen exp in mfg & fin systems req. Min 5 yrs RPG II ideal. Excellent reloc pkg. Salary $28,500

MIS MANAGER

MBA with min 10 yrs data proc exp ideal for this top lvl corp slot. Mfg expertise, up thru the ranks record & proven mgmt track record necessary. Admin resp incl staffing & budgeting. Salary $35,000

SOFTWARE SYS PROGRAMMER

Technically competent sys prog in areas of OS/VS1 SYSGENS, BAL & MVS will handle wide variety of resp from selection thru maint of software, analysis of software problems & vendor relationships. IBM 4300 shop. Career oppty in large fin inst loc Western NY. Salary $35,000

Pam Siegal
ROBERT HALF
of Buffalo, Inc.
1310 Liberty Bank Bldg.
Buffalo, NY 14202
(716) 842-0801

ALBUQUERQUE

CICS

Sophisticated IBM installation. Excellent growth potential. Requires 3+ years CICS exp in an OS environment. To $30,000

SYS 34

Expanding bank group offers career position as DP manager. Requires hands-on exp with Sys 34 in RPG II. Start $25,000

Dick Starnes
ROBERT HALF
of New Mexico
P.O. Box 3320
Albuquerque, NM 87190
(505) 884-4557

NEW ORLEANS

RPG

Energy firm. Programmer Analyst position. Accounting or oil & gas applications exp. To $30,000

FORTRAN

Multi billion dollar international firm. Prog/Analyst or System Analyst. Engineering or graphics a plus. To $35,000

FORTRAN 77

Energy firm. Beautiful location. Candidate must have Fortran 77 exp. Excellent relocation package. Excellent benefits. To $35,000

ROBERT HALF
of New Orleans
4630 One Shell Square
New Orleans, LA 70139
(504) 524-3773

ATLANTA

PROGRAMMER/ANALYST

Data Center for National firm seeks COBOL, large IBM, VM/OS VS1, and CMS experience in commercial-financial applications. $29,000

DIRECTOR OF DP

Chance to become VP of Company. Mgmt equipment-planning background. Choose new hardware. High visability heavy interface with users in top industrial construction firm. $40,000

SYSTEMS ANALYST

If you are comfortable in COBOL and FORTRAN and have Engineering or Manufacturing environment background and enjoy new projects using IBM 4331 OS/VM then this is for you. $30,000

Ellen Wallin
ROBERT HALF
of Atlanta, Inc.
3379 Peachtree Rd. N.E.
P.O. Box 10201
Atlanta, GA 30319-0201
(404) 266-2153

DENVER

DP MANAGER

Rapidly growing chemical company in Northern Colorado seeks a person to run a rapidly growing data processing dept. Company is converting from a SYS 34 to SYSTEM 38 environment. Excellent ground floor mgmt opportunity for a person with good administrative and coordination abilities. Start $40,000 range

PROJECT LEADER

Major Denver oil and gas company has a position available for a person with solid RPGII or III experience. Person must have business applications background on a SYS 34 or 38. Start Mid $30's

ROBERT HALF
of Denver, Inc.
2 Park Central
Denver, CO 80202
(303) 629-1010

PALM BEACH COUNTY

PROGRAMMER/ANALYST

Financial organization going through growing pains seeks an above average contributor. Your background must include COBOL, ALGOL on Burroughs large scale hardware and special emphasis with GEMCOS and Banking Applications. You will interface with all levels of management. Excellent benefits. This is the chance you have been waiting for. Salary to $35,000

Rick Pitman
ROBERT HALF
of Ft. Lauderdale, Inc.
7770 W. Oakland Park Blvd.
Suite 410
Ft. Lauderdale, FL 33321
(305) 742-0200

COLUMBUS

NCR PROGRAMMER

High caliber firm needs NCR expertise. 3-5 years TOTAL, COBOL, VRX and on-line experience. Superb benefit package. Salary $14-25,000

HP PROG/ANAL

National firm seeking Hewlett Packard programmer who feels confident in a consulting role. 2 plus years experience with COBOL and business applications. Salary $20-23,000

SYSTEMS PROG

Very progressive shop in a manufacturing environment. A growth opportunity. 2 years systems programming DOS/VSE, OS/MVS and CICS and large IBM mainframes. Excellent benefits. Salary $20-25,000

SR SYSTEMS ANAL

This opportunity is with a large multi-national with an emphasis in manufacturing. You should have 4-5 years experience, COBOL, 370 OS/VS, Total and MRP. Comprehensive benefits. Salary $23-28,000

SYSTEMS PROG-NCR

Manufacturing co looking for knowledgeable VRX systems person. Knowledge of COBOL and Neat 3 and 8570 is necessary. Excellent benefits and relocation. Midwest location. Salary $25-38,000

Kurt Hopwood
ROBERT HALF
of Columbus, Inc.
88 East Broad St.,
Suite 1150
Columbus, OH 43215
(614) 221-9300

MINNEAPOLIS/ ST. PAUL

MIS DIRECTOR

Exciting new opening. Client is ready to begin major conversion and needs a strong, competent mgr to head up the effort. To qualify you must have extensive bkgd in purchasing hardware, software conversion and personnel training. Your current staff should exceed 20 prof'ls. Distribution industry exp is a definite plus. Salary to Mid-$40's

DP MANAGER

EXCLUSIVE! Rapid growth potential has created a need for a DP Director. In this start-up position, you will be responsible for equipment selection, site preparation, staffing and software development. Your bkgd should include managerial exp, knowledge of the mini market and prior equipment selection and installation. Position near Fargo, ND. Salary to Mid-$40's

Sue Hawkins
ROBERT HALF
of Minnesota, Inc.
2236 IDS Center
Minneapolis, MN 55402
(612) 339-9001

FREE:

Ask for our latest Salary Survey.

RHF-120

Software Professionals

NCR Offers A Unique Fringe Benefit: SAN DIEGO

San Diego is the capital of the active life. It's amazing how wide a range of housing options still remain, considering that the weather is ideal for a year-round pursuit of outdoor recreation. And NCR Systems Engineering —Scripps Ranch, affords you an active career as well. The Systems Developer who thrives on research, design and development challenges in electronic data processing systems can find an environment here to grow and succeed. In short, the following opportunities at NCR can fulfill your life, both during the week and on the weekend as well.

Communication And Tools Developers

Perform design, development, specification, test and support of software components. Several areas involve communications management software, terminal and network interfaces, and PASCAL-based compiler enhancements BSCS degree plus 3-7 years software development experience in tools, compilers, data communication and high-level block structured languages

Systems and Applications Programmer Analysts

Use latest concepts in software and systems evaluation to conduct product test definition, product specification and quality evaluation. Involves interactive business operating systems, CODASYL and TOTAL Data Base Management Systems; Software and systems quality assurance; and systems communication. BSCS plus 3 years experience and knowledge of user environments required

Software Integration Analysts/Programmers

Perform functional specification review, test bed development, results monitoring and evaluation, and microcode integration Develop tools for software/firmware source object control systems One project leader position. BSCS plus 2-5 years experience with assembly language programming, PASCAL/COBOL, microcode, and some application programming

Interactive Systems Architects

Be a technical contributor in a senior level group tasked with defining the architecture for advanced transactional and interactive processing systems. Key areas include OS Kernal, performance modeling and BLSI based hardware in small to medium systems BSCS/advanced degree preferred plus minimum 10 years business system experience.

Advanced Data Base Architects

Develop and demonstrate advanced Data Base Management technology, addressing long range requirements and next generation hardware. BSCS/MSCS level preferred with broad systems experience in building or using sophisticated data base systems, possess state-of-the-art awareness of technology and market trends.

Performance Measurement Analysts

Create and develop performance monitors and synthetic benchmarks; measure and analyze software systems performance. DBCS/BSEE and 1-3 years operating systems development experience required, plus performance measurement background preferred.

Firmware Systems Analysts

Design and implement firmware for next generation distributed/processing systems, includes work in micro programming, virtual machine evaluation, I/O processor/system console firmware interpreters, and VLSI-based systems BSCS degree plus 1-3 years firmware design experience; assembly language programming, I/O, PASCAL or COBOL required.

Testware Development Analysts

Develop testware involving diagnostic programs for mainframes and peripherals, write dedicated drivers and concurrent peripheral diagnostics BSCS degree with 5 years experience, knowledge of assembly language, PASCAL, mirocode, and some COBOL highly desirable.

The choice is yours San Diego's appeal to both family and singles lifestyles, and the wealth of recreation, coupled with NCR Systems Engineering's dynamic career challenges, make up a package you should look into. Put some enjoyment back into your life Apply for the position of your choice by sending your resume to.

Mr. Doug Sjoberg, Personnel Resources, Systems Engineering — Scripps Ranch, Dept. H-54, NCR Corporation, 9900 Old Grove Road, San Diego, CA 92131. (714) 268-5372.

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EDP
JOBS IN THE MIDWEST

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Call collect

Analysts, Project Leaders, Programmers with a year plus experience, let us help you find a position in Minnesota, Wisconsin, Iowa, North and South Dakota. Client companies assume our fee. Send resume or call.

ELECTRONIC SYSTEMS PERSONNEL
858 TCF Tower, 121 So. 8th Street
Minneapolis, MN 55402

esp

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CHALLENGING, TAX-FREE POSITIONS

The Saudi Arabian National Center for Science and Technology, Riyadh, Saudi Arabia, has immediate opening for:

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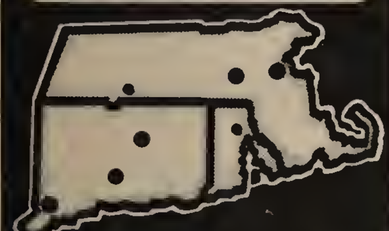

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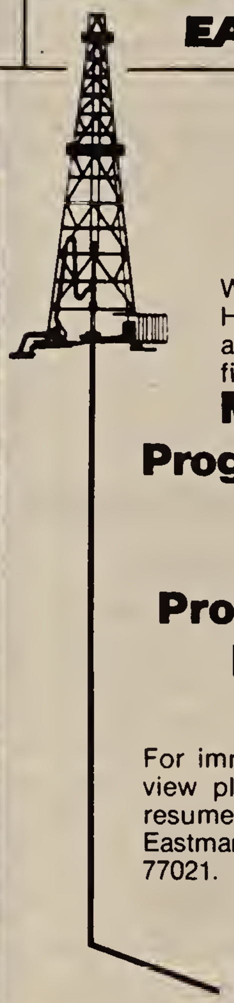

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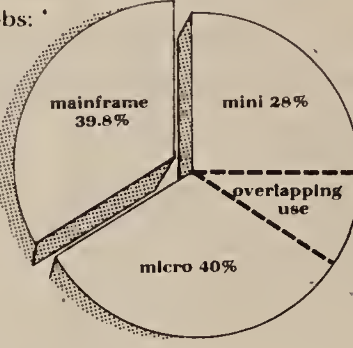

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In California **(415) 328-4602** Outside California call toll-free **(800) 227-8365**

*Based on the *InfoWorld* Readership survey, Fall 1980.

TEXAS HILL COUNTRY

MANAGER OF SYSTEM ENGINEERS

$45K

Develop and design complex control type systems. Lead in network planning, product definition, investigating new technology, and evaluating changing industry standards.

Candidate should have a broad background in software development, and in-depth knowledge of computer mainframes and associated peripheral equipment, and now in a management role. If you have this background and BS/MSEE or CS or equivalent, contact us.

Contact Glen Whiting, Vivian Callender Woods, or Larry Crosslin at:

(713) 850-1122

JOSEPH CHRIS
PERSONNEL SERVICES, INC.
1900 West Loop South, Ste 900
Houston, TX 77027

DP PROFESSIONALS
We are headed into the future, ARE YOU?

We are an executive recruiting firm, with multiple openings in the South and the Midwest, minimum three years experience in programming, systems analyst, and management.

ALSO

Process Control/Analyst, seismic experience or Demulti Plex and SORT.
Aero Service Programmer, gravity magnetic and spectro meter data experience.

Salaries 22K to 42K
Interview, Relocation and Fee all company paid.
For confidential service send resume to:
Dave Kennedy
AMERICAN PERSONNEL, INC.
P.O. Box 2743
West Monroe, LA 71291
Or Toll Free 1-800-555-5151
LA Residents Collect (318) 325-0352
Member NAPC-LAPC

Technical Systems Analyst

Develop computer programs to be used in the company's ware system for engineering processes of metal building systems. Communicate with Engineering, Graphics, and Computer Departments to ensure the capability of the software system. Applicant must have knowledge of system approach concept, be proficient in Fortran programming, B.S. in Civil Engineering and two years Civil Engineering experience. 40 hours per week; $2,000 per month. Send resume to:

Raymond Miller
Pascoe Building Systems
1301 East Lexington
Pomona, CA 91766
EOE/MF

FACULTY POSITION IN THE LAND OF ENCHANTMENT

New Mexico Tech is seeking to fill two full-time, tenure-track faculty positions in computer science. Duties include teaching two classes per semester (undergraduate and graduate), supervision of graduate students and research activities.

Applications are solicited in the areas of complexity theory, analysis of algorithms, theory of computation and/or operating systems. Applicants in other areas will be considered. Typical 9 month salaries will range from $28,000 to $35,000 but higher salaries will be considered for exceptional candidates.

The department operates a VAX 11/750 and PDP 11/34, both running Unix. The Institute's DEC 2060 is also available for faculty and student use. Tech has 1300 undergraduate and graduate students; 10% are computer science majors.

New Mexico Tech is a small institute with an informal atmosphere and is devoted to excellence in both instruction and research. There is an active graduate program in the physical and geological sciences and a rapidly expanding masters and doctorate program in computer science.

Tech is locate in Socorro, a residential community of 7,000, situated on the Rio Grande in a broad valley surrounded by mountains and is seventy-five miles south of metropolitan Albuquerque on Interstate 25. Socorro has a mild, dry, sunny climate, with a January average daily maximum of 52 degrees. Nearby recreational activities include Tech's 19 hole golf course, skiing, hunting, and fishing.

For additional information contact:

Dr. Tom Hintz, Chairman
Department of Computer Science
New Mexico Institute of Mining & Technology
Socorro, N.M. 87801
phone: 505-835-5126

Applications should be received before November 1 by:

Faculty Search Committee
Department of Computer Science
New Mexico Institute of Mining and Technology
Socorro, N.M. 87801

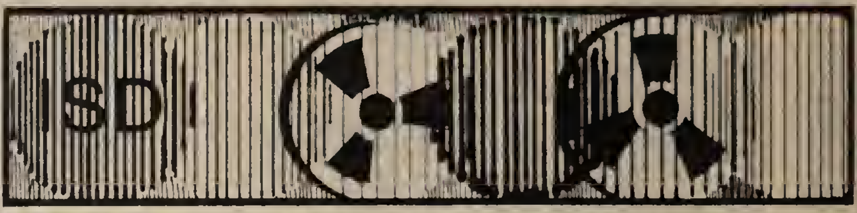
Data Processing Programming Manager

Winter's coming! Tired of ever increasing heating bills? State income taxes? Try Texas! The Fort Worth Star-Telegram, a major daily newspaper, has a key opening in its data processing area. You will manage the programming staff and play a major role in the design and implementation of on-line computer applications. The successful candidate should have advanced knowledge on either DEC RSTS/E using COBOL, DIBOL or Basic Plus, or HP 3000 MPE using COBOL. Newspaper data processing experience is preferred. We offer a very competitive salary and benefit package plus excellent relocation assistance. Send your resume and salary requirements to:

Fort Worth Star-Telegram, Personnel Director, PO Box 1870, Fort Worth, TX 76101

An Equal Opportunity Employer M/F

Small private college near mountains and ski areas in Vermont seeks **Coordinator of Academic Computer Services.** Excellent benefits including tuition for self and dependents. Master's degree preferred; Bachelor's degree in related field required. Experience as Systems Programmer and/or Systems Analyst/Programmer on a time sharing system preferably using PDP-11 Computer, operating under the RSTS/E Operating System, in an academic setting. Working knowledge of FORTRAN, BASIC and COBOL; interested in learning other high level languages and packages. Successful candidate will possess good oral and written skills, have the ability to supervise student consultants; interact effectively with faculty and students and be a selfstarter with high motivation. Teaching experience a plus. Send resume to the **Personnel Office, Saint Michael's College, Winooski, Vt. 05404.** AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER.



HIGH TECHNOLOGY WITH THE PERSONAL TOUCH!

TRW's Information Services Division (ISD) provides information processing for the consumer and business credit reporting industries.

As a small, high technology division of TRW, ISD maintains a professional but casual environment with benefits you'd expect to find only in a larger organization. Here, individual contributions don't go unnoticed, and promotions occur from within.

At ISD, you'll learn IMS and CICS and enhance other skills through extensive in-house and external training programs. Our current environment includes an AMDAHL 470 V/6 and an IBM 3033 MVS, JES 2 with TSO/SPF, VTAM, CICS and a **soon-to-be-installed IMS DB/DC System!**

We currently have needs in the following areas:

- **Supervisor of DBA** – Requires 8 years of overall DP experience with at least 2 years of supervisory experience in an IMS-DBA experience.
- **Sr. Systems Analysts** – Requires 2 years of Statistical Data Analysis and Algorithm Design. Degree in Statistics, or Operations Research is preferred.
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- **Sr. Programmer Analysts** – Requires 4 years of OS COBOL or BAL experience. Strong analysis and design skills preferred.

ISD offers an outstanding benefits package including comprehensive medical, dental and life insurance plans plus retirement, longterm disability, stock savings and tuition reimbursement programs, and full relocation.

Help Information Services shape the Future! Enjoy a progressive environment composed of top professionals and responsive management.

Please CALL COLLECT or send resume in confidence to:

Deana St. John
505 City Parkway West
Suite 100-CW
Orange, CA 92668
(714) 937-2487

TRW
INFORMATION SERVICES DIVISION

Equal Opportunity Employer M/F/H/V

Univac DMS and OS 1100 Professionals Looking For A Place To Grow? Come grow with us in California Virginia and North Carolina

Data Base Management Assoc. a software systems company, backed up by 70 years experience in the marketing development installation and support of Univac 1100 based applications and systems software, is currently experiencing tremendous growth by providing the very highest levels of Univac 1100 systems consulting and software support services to our growing prestigious 1100 client base.

As a member of our technical support staff we can offer you a challenge in one of the following positions:

OS1100 Systems Analyst- minimum three years experience with OS1100 internals support plus strong assembler MASAM, CSP, CMS or DCT experience a plus.

DMS1100 Systems Analyst- minimum three years experience with DSM1100 in design internals applications support, user education. Level 8 experience a plus.

DBMA offers excellent salaries, paid Blue Cross Blue Shield, dental, profit sharing and stock plan. Send your resume in confidence to:

Attn: George Wayne
Data Base Management Assoc., Inc.
2820 W. Maple, Ste. 211, Troy, MI 48084
(313) 649-3119

F-O-R-T-U-N-E Personnel Agency

of Phoenix, Inc.

Is Now

J.M. Meredith & Associates, Inc.

4001 N. 32nd Street

Phoenix, Arizona 85018

(602) 954-7100

Employment Representative

How can you tell a great job from a good one?

Most good jobs offer security, some satisfaction, and a reasonably pleasant way to spend your day. But a *great* job? It should offer you outstanding opportunity, genuine challenge, and real responsibility (with enough autonomy to carry out that responsibility). In short, a great job encourages, recognizes, and rewards *individual achievement.*

That's the kind of opportunity we have to offer at Racal-Milgo, a leading manufacturer of data communications products for over 25 years. Our skyrocketing growth rate has created an exciting opening for a professional Employment Representative to recruit top talent for our Sales/Marketing Department.

Specific responsibilities include: establishing job requirements; identifying, screening, and interviewing applicants; negotiating offers; maintaining contact with a network of candidate sources; determining appropriate recruiting strategies; and coordinating the relocation of new hires and transferred employees. In the search for new talent, you'll be traveling nationwide (approximately 25%) to job fairs and technical schools, as well as working with our Regional Offices across the country.

To qualify for this highly visible position, you should have a BBA or equivalent, and at least one year of recruiting experience in a high-technology environment (ideally, in the electronics field). In addition, you should have the "savvy" to deal with all levels of management in a confident and sophisticated manner.

Racal-Milgo offers a generous compensation package, excellent fringe benefits, and the opportunity to work in our beautiful, new Sales/Marketing facilities in Ft. Lauderdale. Best of all, a career with Racal-Milgo gives you every chance to realize your professional goals. Take the first step towards a "great job" by sending your resume today to *LINDA HUETT* in our Corporate Headquarters.

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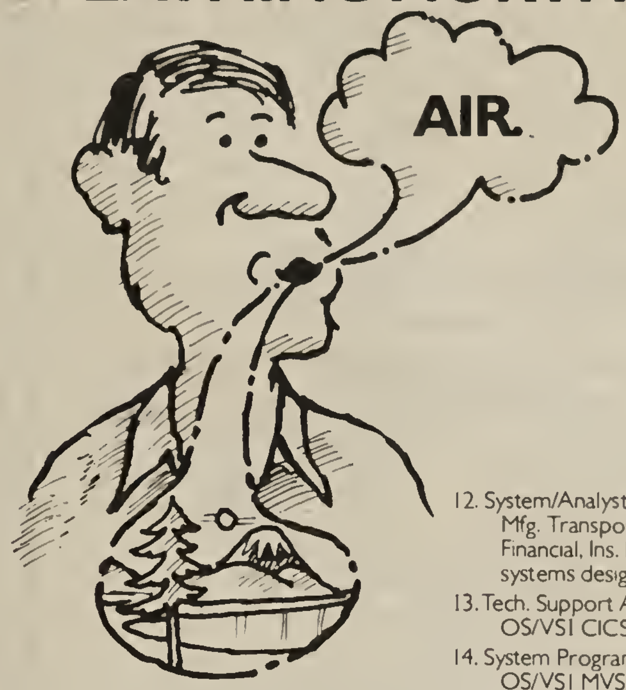
On-line around the world

8600 N. W. 41st Street, Miami, Florida 33166
(305) 592-8600 Equal Opportunity Employer

18† BETTER CAREERS THAT'LL HAVE YOU BREATHING NORTHWEST



Read Seattle & Portland opportunities:

1. Data Center Mgr. ...... to $50K
   Manage large multiple IBM CPU shop
2. Communications Specialist .... to $35K
   SNA/VTAM/NCP ACF/NCP
3. Project Lead Senior Programmer/Analyst ... to $30K
   (CICS DL/I)
4. HP 3000 Analyst .... to $30K
   MPE, IMAGE, QUERY COBOL
5. Programmer Analyst ... to $28K
   COBOL IBM HONEYWELL
6. Telecommunication Coordinator .... to $32K
   Troubleshooting SNA
   BISYNC SDLC
7. Technical Services Mgr. .. to $45K
   Manage 12+ technology professionals, preferably MVS exp.
8. Project Lead .... to $31K
   Banking, Financial, Large IBM
   On-line development
9. Programmer/Analyst ... to $24K
   Banking, Thrift, COBOL, BAL
10. Programmers .... to $20K
    Mfg. Ins. Financial,
    COBOL Assembler
11. Sr. Programmer/Analyst . to $27K
    Analysis user contact,
    team leader
12. System/Analyst .... to $28K
    Mfg. Transportation, Financial, Ins. Large systems design
13. Tech. Support Analyst ... to $28K
    OS/VS1 CICS Command level
14. System Programmers ... to $35K
    OS/VS1 MVS
15. Programmer/Analyst ... to $30K
    PC 3600 Assembler
16. Programmer/Analyst ... to $26K
    HP 3000 Mfg. Degreed
17. Data Base Specialist .... to $35K
    IMS data base support
    Data Dictionary
18. Programmer/Analyst
    MICR .... to $27K
    CPCS required

And more.

We speak your language. Nobody knows the Data Processing market like Houser, Martin, Morris. We're the Northwest's leading DP placement specialists. So we know what's what in this business; where the best jobs are, what are current salary levels, how to look for career advancement. We're especially helpful in showing you where you will fit. Our clients are companies with outstanding opportunities to be seen at all levels.

Interested? Call us today and chat with one of our placement professionals. Or mail your resume for these and other positions to:

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1940 116th Avenue NE
C-90015, Suite A
Bellevue, Washington 98009
(206) 453-2700

HMM Houser, Martin, Morris & Associates

Member NCA — 27 offices nationwide

Computer Services - Banking - KUWAIT

Managers, Analysts and Programmers

The National Bank of Kuwait, one of the largest commercial banks in the Middle East, with a network of over 40 domestic branches, is seeking high achievers who enjoy professional challenge. In the advanced business and living environment of Kuwait, the Bank is developing a variety of technically advanced, real-time teleprocessing systems.

Systems & Programming Manager

To lead a team of 30. Ideally candidates will have at least 5 years' management experience in a medium to large installation, preferably in banking. They should also have a record of substantial achievement, and have taken at least one major system from feasibility study to implementation.

User Services Manager

To lead a team in implementing new systems and designing and improving clerical methods and procedures. Candidates should be able managers and communicators and have significant experience in bank automation and operations.

Systems Analysts, Technical Analysts, Programmers

Systems Analysts, Technical Analysts, and Programmers should have at least 3 years' appropriate experience and, ideally, be familiar with large-scale NCR systems.

In all cases, knowledge of Arabic would be an advantage. The salaries and other benefits are attractive and tax free.

Please write in confidence to:
Assistant General Manager, Human Resources Division,
The National Bank of Kuwait S.A.K.,
P.O. Box 95, Safat - Kuwait.

The National Bank of Kuwait S.A.K.

Tandem Mini Networking

PROJECT MANAGERS

San Francisco Bay Area

Our client, a very large, profitable organization needs data processing professionals with the following qualifications:

- 2-6 years experience as Programmer / Analyst in networking applications.
- COBOL
- Good Communication skills.
- Motivated by advancement opportunity in a dynamic, well-managed, large organization.

We are consultants to management. For immediate and confidential consideration, please send detailed resume to: **CONSULTANT Dept. C-0921, P.O. Box 2236, San Francisco, CA 94126.** Employer assumes fee.

SENIOR PROGRAMMER

with manufacturing co. will direct & evaluate programming personnel for projects in administrative area to establish & enforce standard methods for organizing, coding & testing programs, set time schedules & estimate personnel needs & cost of projects. BS in math or comp. sci. and 2 yrs. programming exp. req'd. Must be experienced in COBOL & IBM Assembler. $30,000/yr.; 37½ hrs./wk.

Send resumes to: Connecticut State Job Service, 731 West Avenue, Norwalk, CT 06850. Refer to Job Order #207392.

PROGRAMMER/ ANALYST

NYSE manufacturing company with headquarters in Charlotte, N.C. has position available for programmer/analyst on financial applications team.

Candidates should have:

- 3-5 years COBOL programming experience; some systems analysis essential
- Thorough knowledge of MSA Payroll/Personnel software package a definite plus
- Ability to work well with user departments
- 4-year degree preferred
- Experience in IBM 370/OS and/or Univac 90-80 VS/9 environment

We offer:

- Competitive salary and benefits package, including relocation reimbursement
- Small, professional DP staff working in a progressive, innovative environment
- Opportunity to "take charge" of the maintenance and development associated with this large, vital software package

Send resume, including salary requirements, to:

Personnel Manager
REXHAM CORPORATION
P.O. Box 35068, Charlotte, N.C. 28235

Equal Opportunity Employer M/F

Rexham

Join the career opportunities of the 80's in the Sunbelt.

TCC has many career openings in Austin, Texas.

Austin has been called a modern day boom town fueled by its rapidly-growing business sector. This expansion is in the electronics and data processing/systems industries. Combined with this boom Austin is known for

- Five lakes, sailboating, water skiing
- Tennis, softball, swimming
- 450,000+ population
- Country music, second only to Nashville
- Cuisine, entertainment, and lodging
- Eight professional theaters
- First-rate symphony orchestra
- The University of Texas
- Low cost of living

We have openings for select individuals to fill the following positions:

Programmer/analyst
- IBM OS or DOS
- Assembler and/or COBOL
- P&C or life insurance a plus
- Two or more years experience
- CICS (Command/Macro)

Senior Life Insurance Analyst
- Industry specialists
- Life and health insurance
- Annuity products
- Effective user interface
- Universal life

Following areas a heavy plus
- Structured technique
- DMS/CICS/VS
- DL 1
- SQL or higher level access tools

- Top industry salaries
- Attractive benefits
- Paid relocation

- **Send resume or call collect—**

Personnel Search
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3429 Executive Center Dr.
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(512) 345-5700

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The leading insurance software company serving the Life and Health industry.

Our contracts prohibit hiring current employees of companies using LIFE/70
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TECHNICAL WRITERS

Convergent Technologies, a manufacturer of desktop minicomputer systems, is looking for OUTSTANDING people for the following positions:

Hardware

4+ years' experience in computer hardware documentation, to document our hardware, including our newest workstation and peripherals, and installation and service procedures. Must understand schematics and digital integrated devices.

Software

3+ years' experience in computer software documentation, to document our software, including our own multitasking OS, communications, languages, DBMS, network, etc.

These are new positions with a small, dynamic and rapidly growing company. Work with the best and most dedicated technical people in the field.

Send resume to:

Laurie Haron
CONVERGENT TECHNOLOGIES
2500 Augustine Dr.
Santa Clara, CA 95051
408/727-8830

FLORIDA

availABILITY inc.

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Experienced with IBM, Burroughs, or NCR Using Cobol or Assembler	To $30K

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DATA BASE PRO'S

IMS IDMS	To $35K

SOFTWARE

IBM DOS VS MVS CICS HNYWI GCOS GMAP	To $30K

COMMERCIAL

P/A Bal, VSAM	To $22K
P/A Cobol IMS	To $30K
P/A Fortran, DEC	To $22K
P/A MVS, Cobol, CICS	To $25K
P/A DOS/VS, Cobol, CICS	To $22K
P/A Burr Cobol, NOL	To $22K

MIS DIRECTOR

Mini Comp, Mfg Financial	To $35K

AVAILABILITY, INC.
813/872-2631
Dept. C, P.O. Box 25434
Tampa, Florida 33623

Data Base Design

Large, non-profit, multi-state health care organization with assets in excess of $500 million dollars and corporate offices located in the Mid-west is seeking a qualified data processing professional with the ability to accept a leadership role in the development of a Corporate-wide Information Resource policy, standards and data definitions; to provide staff support to the Corporate IF Committee and task forces; and to assist our Divisions in developing and understanding consistent, workable Information Resource policies. This position will be accountable directly to the Corporate Director of Information Systems.

Position requirements are:

M.S. in Computer Science, Mathematics, or other technical discipline; or Bachelors degree with significant non-degree technical training. Also required seven years broadly based experience in Information Systems, a workable knowledge of state-of-the-art technology in Information Resource Management, and ability to maintain effective oral and written presentations. Two or more years experience in a health care environment and excellent communication skills are highly desirable. The position involves about 50% travel. Competitive salary is negotiable, depending upon education and experience. Liberal benefits are provided. To apply, send resume and salary history, in confidence, to:

C.W. Box 2574
375 Cochituate Rd., Box 880
Framingham, MA 01701

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- POSITION ANNOUNCEMENTS
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- SOFTWARE
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It's easy to advertise in COMPUTERWORLD. If you don't have an advertising agency to supply us with copy, layout and order, or a camera ready mechanical, stat or film negative of your ad, just call one of our ad-takers at 1-800-343-6474. They will be glad to take your ad and typeset it in available fonts at no extra charge. If you have lengthy ads that require logos and artwork, just send a clean typewritten copy of your ad to the classified advertising department at COMPUTERWORLD (telecopier service is available): note the ad size you want; and, if you want your company logo to appear in your ad, please be sure to include a camera-ready copy with your insertion order. You should also supply any special borders, headlines and artwork that you want in your ad. Our Art Department will follow your suggested layout as closely as possible if you wish to send one.

Ad closing is every Friday, 6 working days prior to issue date.

Rates: Open rate is $84.70 per column inch. Columns are 2" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $169.40 per insertion. Additional space is available in half-inch increments. Some sample sizes and costs are shown.

1 col x 4" — 338.80
2 cols x 4" — 677.60
2 cols x 5" — 847.00
2 cols x 8" — 1355.20

Discounts are available when you run more than 35 column inches of advertising in a year anywhere in Computerworld. Box Numbers are available. $10 per insertion.
Ad Closing is every Friday, 6 working days prior to issue date (issues are dated Monday)

To reserve space for your ad, or if you'd like more information on Classified advertising in COMPUTERWORLD, call our office nearest you.

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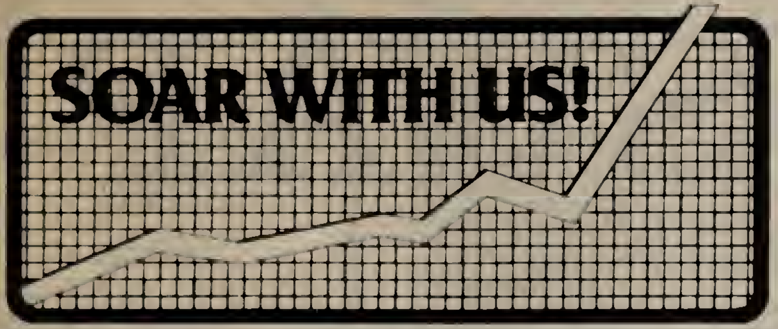
New York - (201) 967-1350
Chicago - (312) 827-4433
San Francisco - (415) 421-7330
Los Angeles - (213) 450-7181
TELECOPIER SERVICE - (617) 879-0700

William J. Mills, Manager Classified Advertising

COMPUTERWORLD
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY


SOAR WITH US!

SOFTWARE ENGINEERS

Join PARADYNE, a dynamic growing company that specializes in data communication network systems. With the addition of computers to our line of products, we have advanced into full systems production of data processing and distributing equipment. We now manufacture computers, logical channel extenders, intelligent CRT's and modems.

Working at PARADYNE is a Software Engineer's dream. You'll work in our beautiful, just-completed Engineering Building on our 3033 which is totally dedicated to software research and development. We are using the S 370 assembler instruction set to develop the operating systems and associated packages for our new line of computers.

Exceptional career opportunities exist in the following areas:

Software Development Engineers
Must be experienced in design and development of system software. IBM 370 assembler strongly preferred. OIS internals, VM/370, B.S.C.S. all favorable.

Software Support Engineers
Must have a strong background maintaining IBM operating systems or packages at a detailed level. Strong assembler and Cobol needed.

Software Test Engineers
Requires experience designing and implementing software to test operating system software and hardware. Performance measurement and analysis helpful. Strong assembler and Cobol needed.

PARADYNE is a company on the grow. Our gross sales have increased 293% during the last two years and our work force has doubled in size over the last year. These circumstances have created tremendous potential for promotion at all levels.

YOU'LL WORK in an atmosphere of professional freedom where your only limitation is your imagination. Salary competitive to start, with an excellent fringe benefit package.

YOU'LL LIVE in one of the most pleasant, safe, clean and affordable communities in America, enjoying an average year 'round temperature of 74°. Whether your recreational interests include major sports, art, theatre, boating, fishing or just plain relaxing in a climate where much of America pays to vacation, you'll find it all...and more in the Tampa Bay area.

Rush your resumé in confidence today to:

Steven C. Hoskins
Paradyne Corporation
P.O. Box 2826
8550 Ulmerton Rd.
Largo, FL 33540

paradyne

An equal opportunity employer M F

STATE OF ALASKA OFFICE OF THE GOVERNOR

THE DIVISION OF BUDGET AND MANAGEMENT IS RECRUITING FOR A SYSTEMS ANALYST

This position is responsible for maintenance of the State's computerized budget system and the development of innovative data processing applications to aid the budget process and support budget analysis and economic research.

The technical environment includes PL/I, OS-MVS, DMS, CICS, CMS, ADABAS and RAMIS II. We are particularly interested in applicants who are highly motivated and can quickly become productive with a minimum of training and supervision.

This position is located in the capital city of Juneau, a coastal community with a population of approximately 20,000.

Please send resumes to the Division of Budget and Management, Office of the Governor, Pouch AM, Juneau, AK 99811. Resumes should be received in Juneau by September 28, 1981.

The Office of the Governor is an equal opportunity employer.

SYSTEMS PROGRAMMER

$1,000 Employment Bonus

InterNorth is seeking an experienced Systems Programmer for assignment to our Houston Data Center. This position will provide technical support to our Data Center and will be involved in the following activities:

- **System performance measurements studies and capacity planning recommendations.**
- **Configuration manipulation and systems processing optimization.**
- **Hardware and software evaluation.**
- **Developing processing priorities schedules and operating standards.**
- **Interface with corporate technical support staff and IBM Systems Engineers.**

The qualified candidate should have 4-5 years related experience with at least 2-3 years as a Systems Programmer in an IBM DOS environment. This position requires knowledge of VSAM, CICS and COBOL or FORTRAN. We prefer a degree in Computer Science or related area. Knowledge of IBM Communications software, time sharing systems, or data base software would be helpful.

InterNorth is a $3.4 billion diversified energy company (Natural Gas, Liquid Fuels, Petrochemicals, Exploration, Coal) formerly known as Northern Natural Gas Company. We offer competitive salaries and benefits including free life and medical insurance, company matching investment plan, company paid retirement, and tuition reimbursement to name only a few. In addition, if you are qualified and hired for this position, you will receive a $1,000 employment bonus. We're conveniently located near Woodway and Post Oak Lane. Free garage parking is provided.

To explore this opportunity, please send your resume in complete confidence to: Mr. John Diffenderfer, InterNorth, P.O. Box 4420, Houston, Texas 77210.

INTERNORTH

An Equal Opportunity Employer M/F/H

Agency Referred Applicants Will Not BE Eligible For This Bonus.

Programmer/Analyst

37.5 hours per week at $23,000 salary. Design, develop and analyze computer processing techniques to solve business problems. Develop and modify programs where necessary to meet needs of customers. Will determine the necessary analytical output of the computer and the use to which data is put to determine necessary adjustments in programs as well as equipment. Write, code, test, document, debug and maintain computer programs.

Requires a M.S. in Electrical Enginering (with emphasis on digital systems) or Computer Science. Also, knowledge of digital systems and computers. Please send resume to:

Ms. Joan Haight
Illinois Job Service
910 S. Michigan Ave.- Rm. 400
Chicago, IL 60605
Reference #8361-H

Computer Programmer/Analyst

XOMED, a leading manufacturer on medical devices, located in Northern Florida is seeking a responsible individual who has COBOL experience, excellent programming skills and an understanding of automated business systems.

Large scale IBM computers and MVS, JES 2, TSO or IMS software "or" knowledge of Burroughs small systems using CMS, NDL and GEMCOS a plus.

We offer excellent benefits and competitive wages. Please submit resume and salary history to:

XOMED INC.
Employee Relations Dept.
8641 Baypine Road
Jacksonville, FL 32216
EOE M/F/H/V

Move to Montana

Some of the most outstanding hunting, fishing and outdoor activity in the world. Programmer analyst must be proficient in COBOL and operations on Burroughs B1855. RPG II and DMS II definite plus. Some operations required. An opportunity to work in a total data base environment for an international multi company transportation firm. Send resume stating salary requirements to:

George Conquest
Transystems, Inc.
PO Box 399
Black Eagle, MT 59414
(406) 727-7500

WASHINGTON, D.C.
Mid-Atlantic

- SOFTWARE ENGINEERS
- SYSTEMS PROGRAMMERS
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Disk Experience Preferred

We have immediate opportunities in all major cities throughout the country.

You won't want to miss this opportunity to join our new, rapidly expanding Field Engineering force. In the last six months this group has grown 100%, and we intend to keep growing at this rate.

System Industries manufactures minicomputer peripheral equipment and systems. We're the world's largest independent supplier of disk memory subsystems. We're small enough to really experience the team spirit that has made us so successful. And the contribution of every individual at System Industries has given us all the opportunity to experience rapid growth as well.

Please send your resume to **Bill Pugelli, 525 Oakmead Parkway, Sunnyvale, California 94086. Or call him COLLECT at (408) 732-1650.** We are an equal opportunity employer.

System Industries

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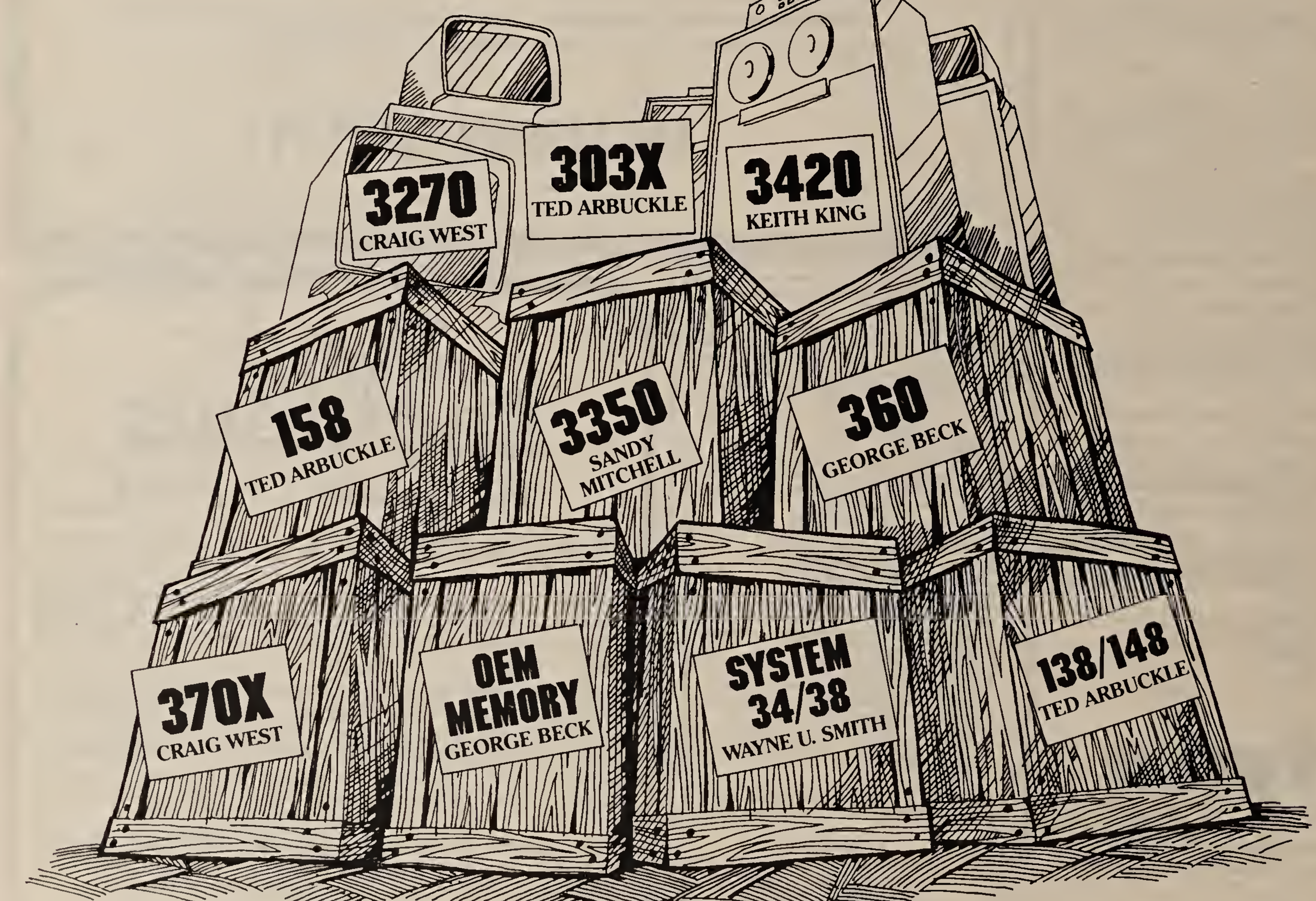

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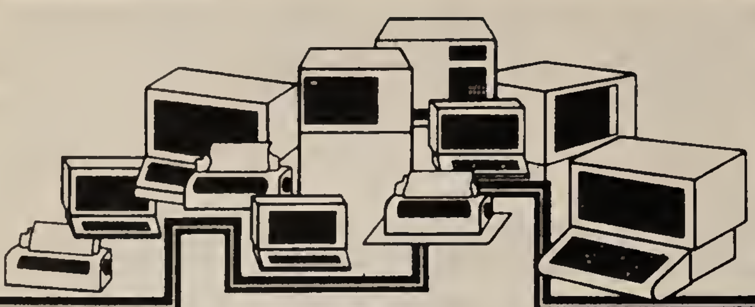

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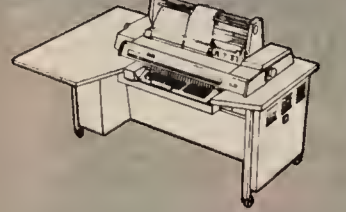

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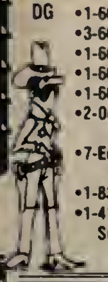

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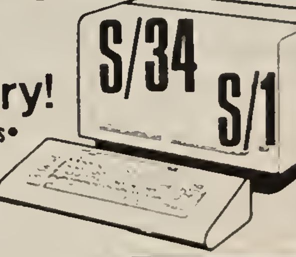

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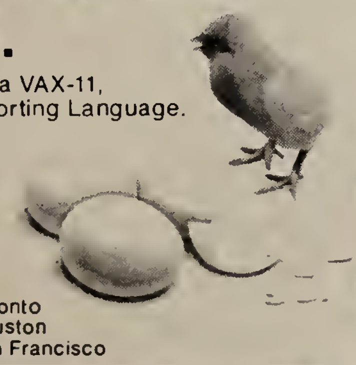

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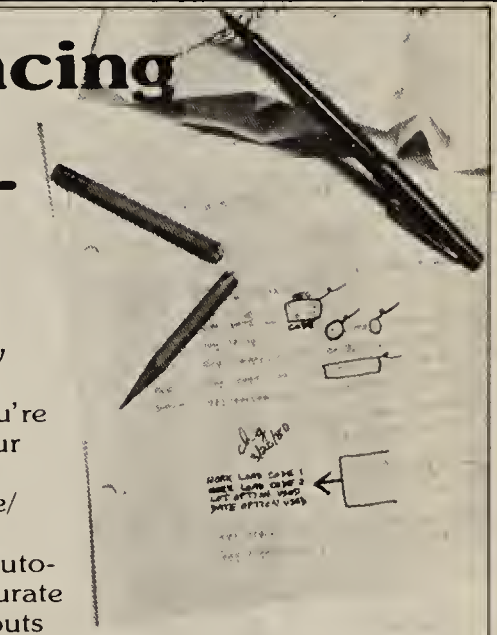

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American Computer Hardware Co. 16
American Terminal Leasing ID/7, 37
Applied Data Research 3
Atlas Energy Systems 77
Axios, Inc. 34

John Beall 69
Bluethumb, Inc. 26
Boeing Co./Recruitment 34, 35, 36
Boole & Babbage 27
Britton Lee 36
Brum-Ko Magnetics Corp. 38

CACI 11
California Software ID/15
Capex Corp. 7
Centurion Computer ID/6
Comdata Corp. 65
ComDesign 34
Commodore Business Machines 76
Communication Networks ID/20
ComPath 46
Compumart 23
Computer Corporation of America ID/18
Computer Management Research 82
Conrac Corp. 80-81
Consolidated Computer 82
Continental Information Systems 10
Control Concepts Corp. ID/14
Cullinane Database Systems, Inc. 49
CW Broadcasting 66
CW International ID/14

Data General 84-85
Datamation Services 24
Delta Data Systems 17
Dexel Leasing Corp. 25
Digital Associates 89
Digital Equipment Corp./NPM 28-29
Digital Equipment Corp./TPL 35
D & O Leasing 37
Dorlen Products 89
D.P.M.A. 54
DTSS 31
Duquesne 55

Eastman Kodak 32
Execucom Systems Corp. 67

F.T.W. Associates, Inc. 16, 60
Fusion Products ID/26

General Electric/Terminet ID/6
Genesys Software Systems 59

Hamilton Rentals 72
Honeywell Information Systems 74
Houston Instruments 30
Hughes Aircraft 86

ICCP 26
IE Systems, Inc. 12
Informatics 19, 20, 21, 22
Information Builders ID/23
Information Concepts ID/10
Innovation Data Processing 9
Intel Corp./Systems Group 72-73
Intertel, Inc. ....
IPL Systems 68
I.P. Sharp Assoc. 18

Lear Siegler 78-79, 87

Marathon Oil Co. 80
McCormack & Dodge ID/24-ID/25
MCAUTO 15
Mini Computer Business Applications 53
Mitron Systems 25
Monosson on DEC 70
Morino Associates, Inc. ID/16-ID/17
MTI, Inc. ID/7

The National Computer Board/Singapore 39
National Software Enterprises 24
NCA 34
Newcorp Products, Inc. 36
Newman Computer Exchange, Inc. 57, 68, 73
NJ Sports & Exposition Authority 15

OEM Business Forum 90-91

Para Research 13

Qwikterm 8

Racal-Milgo ID/12-ID/13
Raytheon Data Systems 42

Selanar ID/22
Software AG ID/27
Software International 92
Software Module Marketing 58
Southern Systems 128
Storage Technology ID/21
Superior Electric 61-63
Systems Documentation, Inc. 23
Systems Engineering Laboratories 88

Technology Transfer Institute 52, 77, ID/7
Televideo Systems 47, 56-57
Telex 48
Texas Instruments 40
Tone Software 34
TSI International 43

University Computing Company ID/2-ID/5

Verbatim 64
Vertex 81
Visual Technology 70
Volker-Craig 14

Wolfe Computer Aptitude Testing 56

Xerox Computer Services Division 33

Yourdon 5

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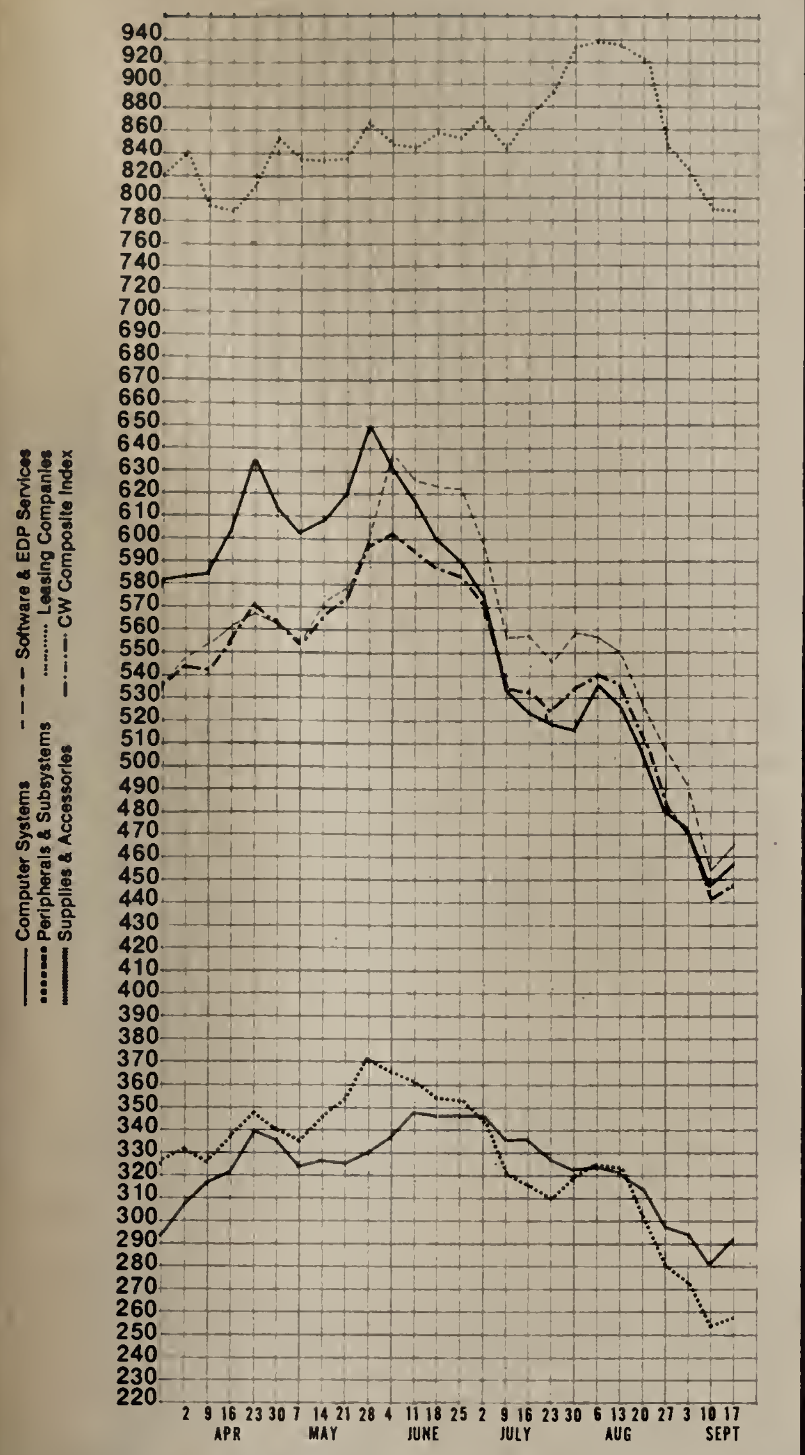

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Computerworld Stock Trading Summary

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COMPUTER SYSTEMS

E X C H		PRICE 1980-81 RANGE (1)	CLDSE SEP 16 1981	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	23- 46	29 1/2	+1 5/8	+5.8
N	8URROUGHS CDRP	33- 72	33	+ 1/4	+0.7
O	CDMPUTER AUTOMATIDN	10- 28	13	+ 1/4	+1.9
N	CDNTRDL DATA CORP	60- 84	67	+ 5/8	+0.8
N	CRAY RESEARCH 1NC	29- 49	31 1/4	+1 1/2	+5.0
N	DATA OENERAL CORP	42- 87	44	+2	+4.7
N	DATAPD1NT CORP	43- 68	42 1/2	-1 3/8	-3.1
N	D1G1TAL EQU1PMENT	80-113	89	- 5/8	-0.6
A	EECO 1NC	7- 19	7 7/8	+ 1/2	+8.7
N	ELECTRDN1C ASSDC.	5- 13	5 5/8	+ 1/8	+2.2
N	FDUR-PHASE SYSTEMS	18- 46	28 1/4	+2 3/4	+10.7
N	FOX8ORO	44- 62	44	-2 1/4	-4.8
O	FULCRUM COMP GRP	1- 3	1	- 1/4	-20.0
O	GENERAL AUTOMAT1ON	7- 16	9 3/4	+ 7/8	+9.8
N	HARR19 CORP	39- 60	40	- 1/2	-1.2
N	HEWLETT-PACKARO CO	33- 54	42 3/8	+ 1/4	+0.5
N	HONEYWELL 1NC	80-115	81 7/8	0	0.0
N	18M	54- 73	54 7/8	+ 3/4	+1.3
O	MAGNU6ON COMP SYSTS	15- 32	15 3/4	- 1/4	-1.5
N	MANAOEMENT ASS1ST	11- 26	12 1/2	+ 3/8	+3.0
O	M1N1-COMPUTER SYST	1- 4	1 1/8	0	0.0
N	MOOULAR COMPUTER SYS	8- 32	10 1/2	+2 1/2	+31.2
N	MOHAWK OATA SC1	12- 32	13 7/8	+1 3/8	+11.0
N	NCR	50- 76	49 3/4	-3 3/8	-6.3
N	PR1ME COMPUTER 1NC	21- 49	21 5/8	- 5/8	-2.8
N	PERK1N-ELMER	22- 36	22 3/4	+ 1/8	+0.5
N	SPERRY CORP	34- 65	35 1/8	0	0.0
O	TANDEM COMPUTERS 1NC	13- 35	26 3/4	+1 1/4	+4.8
N	TEXAS 1NSTRUMENTS	84-151	85 5/8	0	0.0
A	WANG LA8S.	23- 46	24 1/8	+ 1/2	+2.1

LEAS1NG COMPAN1ES

E X C H		PRICE 1980-81 RANGE (1)	CLDSE SEP 16 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	8OOTHE F1NANC1AL CP	18- 29	25 1/2	+1 1/4	+5.1
N	COMD1SCO 1NC	16- 24	17	+1	+6.2
O	COMMERCE GROUP CORP	1- 2	3/4	- 1/8	-14.2
O	COMPUTER 1NVSTRS GRP	1- 4	5/8	0	0.0
O	CONT1NENTAL 1NFO SYS	4- 9	5 5/8	+ 1/8	+2.2
A	DCL 1NC	3- 4	3 3/8	+ 1/8	+3.8
N	DPF 1NC	5- 12	9 1/2	+ 1/4	+2.7
O	1TEL	1- 15	1/2	- 1/8	-20.0
O	LEASPAC CDRP	1- 2	3/8	0	0.0
A	P1ONEER TEX CORP	2- 6	3 7/8	+ 1/4	+6.8
N	REL1ANCE GROUP 1NC	65- 99	86 1/4	+ 3/4	+0.8
N	U.S. LEAS1NG	18- 30	22 1/2	+1	+4.6

EXCH: N=NEW YORK; A=AMER1CAN; P=PH1L-8ALT-WASH
L=NAT1ONAL; M=M1OWEST; O=OVER-THE-COUNTER
O-T-C PR1CES ARE 81O PR1CES AS OF 3 P.M. OR LAST 81O
(1) TO NEAREST DOLLAR

SOFTWARE & EDP SERV1CES

E X C H		PRICE 1980-81 RANGE (1)	CLDSE SEP 16 1981	WEEK NET CHNGE	WEEK PCT CHNGE
O	ADVANCED CDMP TECH	3- 6	3 7/8	+1 1/8	+40.9
O	ADVANCED SYSTEMS 1NC	10- 15	11 1/2	0	0.0
O	ANACDMP 1NC	13- 19	12 7/8	0	0.0
O	ANALYSTS INTL CDRP	3- 14	5	+ 1/2	+11.1
A	APPL1ED DATA RES.	13- 25	13 1/2	- 3/8	-2.7
N	AUTOMAT1C DATA PRDC	22- 32	25 3/4	- 1/2	-1.9
O	CGA CDMPUTER ASSOC	5- 25	5	- 1/4	-4.7
D	CDMPUTER HOR1ZDNS	1- 5	2 3/4	+ 1/2	+22.2
O	COMPUTER NETWDRK	4- 9	4 1/2	- 1/8	-2.7
N	CDMPUTER SC1ENCES	15- 30	15 1/2	- 3/8	-2.3
O	COMPUTER TASK GRDUP	13- 23	13 1/4	+ 1/2	+3.9
O	COMPUTER USAGE	3- 10	2 3/4	0	0.0
O	COMSHARE	8- 21	7 3/4	- 1/4	-3.1
O	CULL1NANE OATA8ASE	29- 69	52 1/2	+5 1/2	+11.7
O	OATA O1MENS1ONS 1NC	1- 4	3/4	-	-7.0
O	OATATA8	2- 4	1 7/8	0	0.0
O	DS1 CORP	4- 9	5 3/4	+ 7/8	+17.9
O	OYATRON CORP	5- 11	5	+ 1/4	+5.2
N	ELECTRON1C DATA SYST	15- 30	22 1/4	+ 1/8	+0.5
O	1NFORMAT1CS 1NC	17- 34	19 1/2	+1	+5.4
O	1NSYTE CORP	1- 3	2 3/8	0	0.0
O	1P9 COMPUTER MARKET.	1- 4	1 3/4	0	0.0
O	KEANE ASSOC1ATE9	4- 8	5 3/4	+ 1/4	+4.5
A	LOG1CON	23- 38	26	-1 1/4	-4.5
O	MNGT SC1 AMER 1NC	17- 26	19	+ 3/4	+4.1
O	MATHEMAT1CA 1NC	12- 19	13 1/4	+ 1/4	+1.9
O	MATHEMAT1CAL APP GRP	15- 28	18	+ 3/4	+4.3
O	NAT1ONAL DATA CORP	14- 28	17 1/8	- 1/2	-2.8
N	PLANN1NG RESEARCH	5- 13	5 1/8	- 1/4	-4.6
O	PROGRAMM1NO & 9YS	1- 2	1 3/8	0	0.0
O	RAP1DATA 1NC	5- 11	5 1/4	+ 1/4	+5.0
O	REYNOLOS & REYNOLO	17- 26	18 1/4	+1	+5.7
O	SE1 CORP	17- 28	20 1/2	- 1/4	-1.2
O	STSC 1NC	9- 28	10	+ 1/4	+2.5
O	SC1ENT1F1C COMPUTERS	8- 16	8 1/2	- 1/2	-5.5
O	SOFTWARE AG	11- 23	10 3/4	-4 1/4	-28.3
N	TYMSHARE 1NC	29- 58	28 3/4	-2 5/8	-8.3
A	URS CORP	12- 18	12 1/8	+ 3/8	+3.1
N	WYLY CDRP	8- 20	9	+1	+12.5

PER1PHERAL9 & SU8SYSTEMS

E X C H		PRICE 1980-81 RANGE (1)	CLDSE SEP 16 1981	WEEK NET CHNGE	WEEK PCT CHNGE
N	AM 1NTERNAT1DNAL	9- 25	8 7/8	- 1/4	-2.7
A	ANDERSON JACO8SON	11- 26	11 5/8	+1	+9.4
O	AUTO-TROL TECHNDLOGY	11- 62	11 3/4	- 1/2	-4.0
O	8EEH1VE 1NT'L	7- 18	7 1/2	0	0.0
A	8OLT,8ERANEK & NEW	9- 25	9 7/8	+ 5/8	+6.7
O	CAM8EX CORP	2- 9	3 5/8	+ 5/8	+20.8
N	CENTRON1CS DATA COMP	7- 40	9 3/4	+2 3/8	+32.2
A	CETEC CORP	4- 9	4 1/4	0	0.0
O	COMPUTER DEV1CES 1NC	5- 10	5	0	0.0
O	COGN1TRON1CS	5- 11	5	- 1/4	-4.7
O	COMPUTER COMMUN.	1- 8	1 1/4	-	-4.7
A	COMPUTER CONSOLES	20- 28	22	+2 3/8	+12.1
O	COMPUTER TRANSCE1VER	3- 9	6 1/4	- 1/4	-3.8
N	COMPUTERV1S1ON CORP	20- 49	30 1/4	-3 5/8	-10.7
N	CONRAC CORP	17- 28	22 3/4	+ 1/2	+2.2

E X C H		PRICE 1980-81 RANGE (1)	CLOSE SEP 18 1981	WEEK NET CHNDE	WEEK PCT CHNGE
A	DATA ACCESS SYSTEMS	5- 23	6	-1	-14.2
A	DATAPRDDUCTS CDRP	21- 44	22 1/2	+ 1/4	+1.1
D	DATUM 1NC	2- 5	1 3/4	0	0.0
D	DEC1S1DN DATA CDMPUT	3- 6	3	0	0.0
D	DELTA DATA SYSTEMS	2- 4	3 3/8	+ 3/4	+28.5
O	DATARAM CDRP	5- 15	5 5/8	+ 5/8	+12.5
N	ELECTRDN1C M & M	4- 9	3 3/4	0	0.0
O	EVANS & SUTHERLAND	18- 40	26	+1	+4.0
D	FA8R1-TEK	2- 6	3 3/8	+ 3/8	+12.5
O	GENERAL COMPUTER 6YS	1- 12	6	- 3/4	-11.1
N	GEN'L DATA CDMM 1ND	9- 19	10 1/4	+1	+10.8
O	DENERAL TERM1NAL CP	1- 4	1	0	0.0
N	HAZELT1NE CORP	20- 35	20 7/8	- 5/8	-2.9
O	1NFDRMAT1ON 1NTL 1NC	8- 17	9 1/2	- 1/2	-5.0
O	1NTEL CDRP	26- 51	26 1/2	- 1/2	-1.8
O	1PL 9YSTEMS 1NC	7- 15	7 3/4	+ 1/2	+8.8
A	LUNOY ELECTRON1CS	9- 18	9 7/8	+ 3/8	+3.9
A	MS1 OATA CORP	11- 27	17	+2 1/2	+17.2
N	MEMOREX	8- 18	12 1/2	- 1/8	-0.8
O	NETWORK 6YSTEMS CORP	15- 25	16 1/2	+1 1/4	+8.1
O	OMEX	2- 12	12	0	0.0
N	PARADYNE CORP	25- 52	34 1/8	-1 1/8	-3.1
A	PENR1L CORP	9- 17	9 1/8	+ 1/4	+2.8
O	RAMTEK CORP	10- 23	11 1/8	- 1/8	-1.1
N	RECOON1T1ON EQU1P	7- 21	7 5/8	+ 1/8	+1.6
O	SCAN DATA	1- 5	1 3/8	- 3/8	-21.4
N	STORAGE TECHNOLOOY	18- 38	32 3/4	+1 3/4	+5.8
O	8YKE8 DATATRON1C9	8- 29	18	- 1/4	-1.3
A	T 8AR 1NC	12- 18	13 1/4	- 1/4	-1.8
A	TEC 1NC	4- 7	4 1/4	- 1/8	-2.8
N	TEKTRON1X 1NC	48- 70	47	+ 1/2	+1.0
N	TELEX	5- 8	5	+ 1/8	+2.5
O	TE8DATA 8Y8TEM8 CP	7- 17	7 1/4	- 1/2	-8.4
A	T1MEPLEX 1NC	10- 18	10 7/8	+ 1/8	+1.1
O	W1LTEK 1NC	1- 3	1 1/2	- 1/8	-7.8

8UPPL1E8 & ACCE88OR1E8

E X C H		PRICE 1980-81 RANGE (1)	CLOSE SEP 18 1981	WEEK NET CHNDE	WEEK PCT CHNGE
N	AMER1CAN 8U8 PROD8	12- 17	12 1/4	0	0.0
O	8ALT1MDRE 8U8 FORM8	1- 2	1	+ 1/4	+33.3
N	8ARRY WR1DHT	18- 24	15 5/8	- 1/4	-1.5
O	CY8ERMAT1C8 1NC	1- 2	1	0	0.0
A	DUPLEX PRODUCT8 1NC	12- 17	13 1/2	0	0.0
N	ENN18 8U8. FORMS	15- 23	18 7/8	+ 7/8	+5.4
N	3M COMPANY	48- 65	48 1/2	+1	+2.0
O	MOORE CORP LTO	27- 38	31 1/4	- 3/8	-1.1
N	NA8HUA CORP	18- 33	18 3/4	+ 3/4	+3.8
O	STANDARD REO18TER	30- 41	32	+ 1/4	+0.7
A	TA8 PRODUCT8 CO	16- 30	18 1/4	+ 1/8	+0.7
N	WALLACE 8U6 FORM8	22- 31	27 3/8	+ 1/8	+0.4

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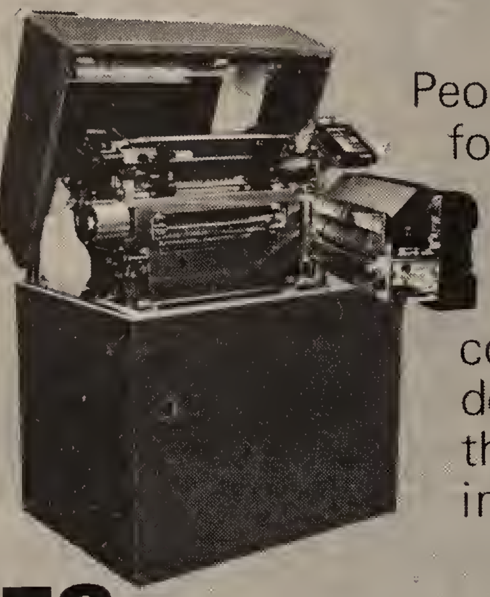

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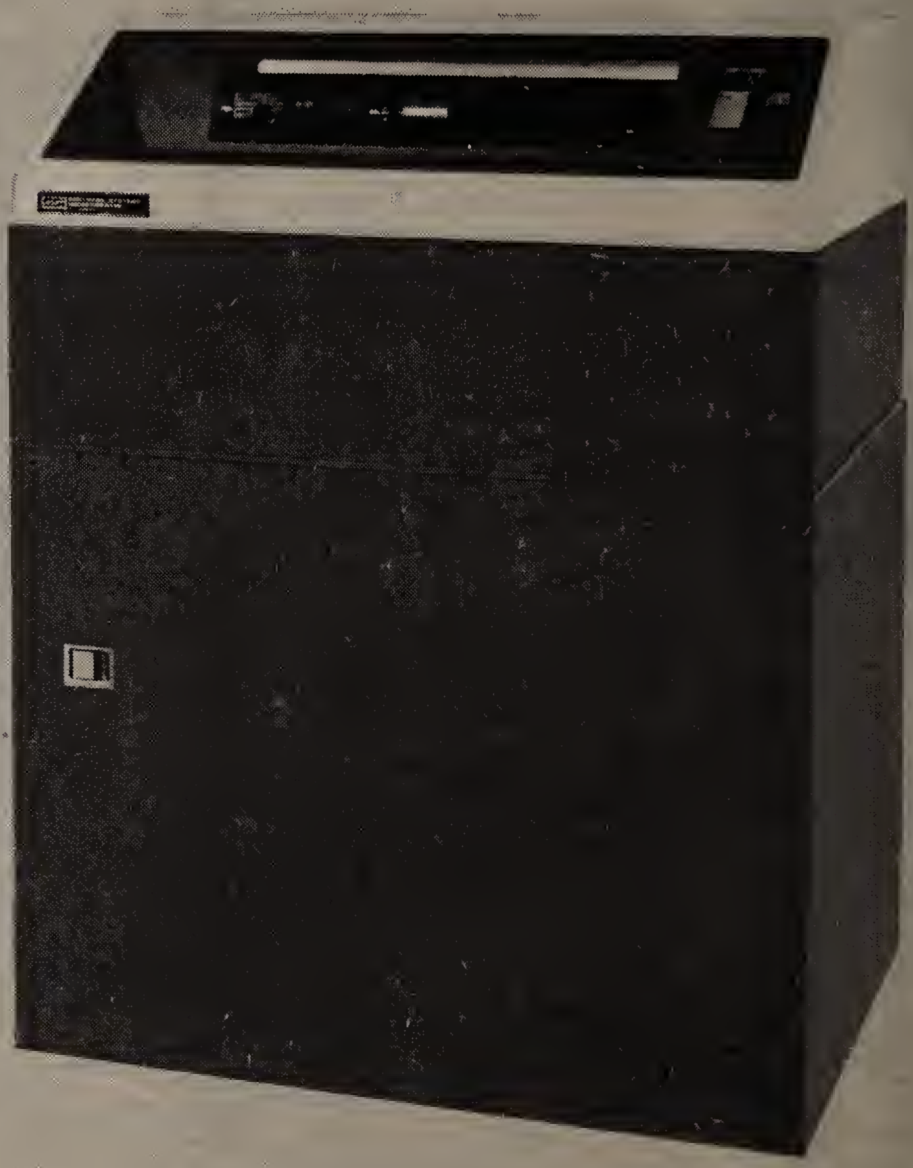

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